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THE ARCHITECTURAL FORUM

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FOR QUARTER CENTURY THE BRICKBUILDER

RECENT AMERICAN
COUNTRY and GOLF CLUBS

SUNLIGHT ENGINEERING
IN CITY PLANNING and HOUSING

By Herbert S. Swan and
George W. Tuttle

YORKSHIP VILLAGE

Government Housing Development
for New York Shipbuilding Corporation

JUNE 1918



PUBLISHED by ROGERS AND MANSON COMPANY
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THE ARCHITECTURAL FORUM

VOLUME XXVIII

NUMBER 6

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VIEW OF ALBEMARLE SQUARE



VIEW OF NORTH AND SOUTH COMMONS

YORKSHIP VILLAGE, A HOUSING DEVELOPMENT NEAR CAMDEN, N. J., FOR
THE NEW YORK SHIPBUILDING CORPORATION

ELECTUS D. LITCHFIELD, ARCHITECT

See page 205

THE ARCHITECTURAL FORUM FOR QUARTER CENTURY THE BRICKBUILDER

VOLUME XXVIII

JUNE 1918

NUMBER 6

Sunlight Engineering in City Planning and Housing*

By HERBERT S. SWAN AND GEORGE W. TUTTLE

THE purpose of this paper will be to provide some of the fundamental data required for the application of sunlight engineering in city planning and housing.†

To what height may buildings be erected on either side of a street and yet provide sufficient sunshine for the apartments and work rooms on the ground floor? How far down on a street façade does the sun shine and how long does it shine there? How small may courts and yards be made without shading the lower stories? What proportion should the length of a court bear to its width? What ratio should its width bear to its height? What is the relative sunshine value of a window fronting on a yard as compared with one fronting on a street? On an inner court? On an outer court? On a side yard? What is the effect of obstructing buildings? How are these factors affected by the orientation of the building? By its latitude? To what depth will sunshine penetrate into a room? What is the relative value of a large window as compared with a small one? What proportion of the sunshine entering a window is shut out from the room by walls of different thicknesses?

These are questions which this paper will enable any one to answer for himself.

The accompanying table defines the points of sunshine and shadow in inner and outer courts on the shortest day in the year, December 21. The coordinates given are applicable to both the side and end walls of any particular court, no matter what its height, width, length, or orientation may be so long as it is rectangular in shape.

To locate the portion of a façade in sunshine on either side of a street at different times of the day, only one shadow need be defined, that of the opposite parallel wall. In the case of a wall of a rectangular court there are two shadows to be defined: first, that from the opposite parallel wall; and, secondly, that from the adjoining wall at right angles. In the case of outer courts opening to a street or yard, the

opposite side of which is improved with buildings, there is also a third shadow to be defined — that of the obstructing buildings. This is true also of inner courts which have their sunshine obstructed by high opposite buildings.

The coordinates in the table define the several portions of a court in sunshine and shadow at sunrise and sunset and at each even hour and half hour throughout the day. The coordinates A of the table are measured horizontally along the given face of the court from the end nearest the sun. The corresponding coordinates B are measured downward from the top of the court. Both coordinates are expressed in terms of the court's width.††

For either side or end walls oriented west of south the table of coordinates is read from the top down in connection with the time of day indicated in the left-hand column for the orientation given at the top. The letters on the left of the coordinates indicate the side of the court then in sunshine and the end of the court through which the sunshine is then entering. For walls oriented east of south the table is read from the bottom up in connection with the time indicated in the right-hand column and the orientation given at the bottom. The letters at the right of the coordinates indicate the side of the court then in sunshine and the end of the court through which the sunshine is then entering.

The detailed method of applying the coordinates to different types of walls will now be described in the following order:

1. The façade of a street;
2. The side wall of an inner court;
3. The end wall of an inner court;

†† The following formulae were used in computing the coordinates:

Let A = horizontal distance of shadow of upper corner of court nearest the sun on opposite side wall, the distance being measured from the end nearest the sun. (See Diagrams.)

Let B = vertical distance of the above shadow point down from top of court. (See Diagrams.)

Let a = azimuth of sun for the given latitude and time (given by tables).

Let h = altitude of sun for the above latitude and time.

Let b = azimuth of side wall of court.

The width of court is assumed as unity.

We then have

$$A = \cot(a-b).$$

$$B = \frac{\tan h}{\sin(a-b)}.$$

* Copyrighted, 1913, by Herbert S. Swan. All rights reserved.

† For a popular discussion of the laws governing this subject, see articles by Herbert S. Swan and George W. Tuttle on "Planning Sunlight Cities" in *The American City*, September and October, 1917. Reprinted as No. 167, *The American City Pamphlets*.

4. The side wall of an outer court;
5. The end wall of an outer court, and
6. The interior of a room.

1. THE FAÇADE OF A STREET.

In defining the points in sunshine and shadow on a street façade the coordinates are expressed in terms of the perpendicular distance between the buildings.

To ascertain the portion of a façade at a given latitude and orientation in sunshine at a given time, where the buildings on either side of a street are of a uniform height and conform to a common building line, the coordinate A should be measured horizontally along the front of the obstructing building from the end toward the sun, and the coordinate B down from the top of the obstructing building. A point directly opposite and at the same elevation on the parallel wall furthest from the sun defines the area in sunshine. That part of the street wall toward the sun from a vertical line drawn through the point fixed by the coordinates derives its sunshine from the open end of the street. The portion above a horizontal line drawn from this point and away from the sun parallel to the tops of the buildings derives its sunshine from over the tops of the obstructing buildings. When the point fixed by the coordinates is beneath the surface of the ground, the entire façade is in sunshine.

Where the height of the shading and shaded buildings is different the same method is followed in ascertaining the portion of the façade in sunshine as where both buildings are of the same height — in either case the point fixed by the coordinates is established with reference to the top and end of the obstructing building toward the sun, though it is plotted at the same elevation and directly opposite on the obstructed building.

Where the height of the obstructing building varies at different points, as in the case of a gabled roof, the point fixed by the two coordinates is located on the obstructed building with reference to each point of the obstructing building having a different height. Lines connecting points fixed by the coordinates on the façade of the obstructed building define the portion in sunshine.

Where the buildings do not conform to a common building line the width of the open space taken as unity is not that directly opposite the point casting the shadow, but the perpendicular distance between the point casting the shadow and its shadow on the opposite building.

In the case of detached buildings or where the

continuity of the street façade is interrupted the shadow point of corners of obstructing buildings given by coordinates A and B will often fall outside the façade in question. These points are then used in the construction of the shadow lines precisely as if the façade were continuous and the portions of the lines outside the actual façade omitted.

The method of ascertaining the shadow line of a street façade is illustrated in detail in Diagram 1.

2. THE SIDE WALL OF AN INNER COURT.

To define the particular part of a side wall receiving sunshine in an inner court, the length of which is oriented in a given direction, at any given time of the day, it is only necessary to locate the point fixed by the coordinates A and B for the given latitude, orientation, and time. If this point falls outside the face of the wall under consideration, then all that part of the wall situated above a diagonal line drawn between this point and the upper corner of the wall at that time nearest the sun will be the part in sunshine (Diagram 2). If this point falls on the face of the wall, then all that part of the wall situated above the diagonal line drawn as just described, and above another line drawn parallel to the top of the court from this

point to the end of the court at that time furthest from the sun, will be the part in sunshine (Diagram 3).

3. THE END WALL OF AN INNER COURT.

The shadow lines on the end wall of an inner court are determined by the use of the same coordinates as for side walls having the same orientation. There is an important difference in their application, however.

The coordinates which locate the shadow cast by a corner of the court on the side walls are proportional to the breadth of the court which for convenience is taken as unity in measuring its dimensions. When the shadows of the corner of a court on its end walls are considered, the length of the court takes the place of its breadth in determining the length of the shadows and the magnitude of the coordinates.

It is, therefore, necessary to multiply each of the coordinates as heretofore given by the length of the court expressed in terms of its width unity. With these new coordinates the shadow lines for the end wall of an inner court can be located as in the case of a side wall (Diagrams 4 and 5).

The method of ascertaining the period of sunshine enjoyed at different points on a wall in an inner court is illustrated in Diagram 9.

SUNSHINE AND SHADOW ON FAÇADE OF EAST AND WEST STREET
WINTER SOLSTICE, 40° NORTH LATITUDE
12:30 P.M.

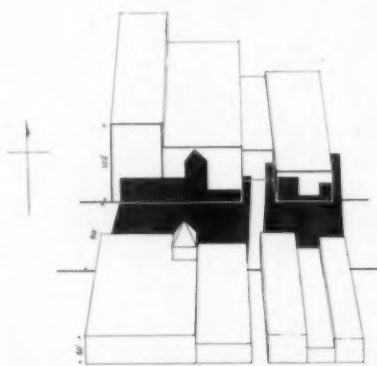


Diagram 1

SUNSHINE AND SHADOW IN INNER COURT

SQUARE COURT ORIENTED NORTH AND SOUTH, 40° NORTH LATITUDE, WINTER SOLSTICE

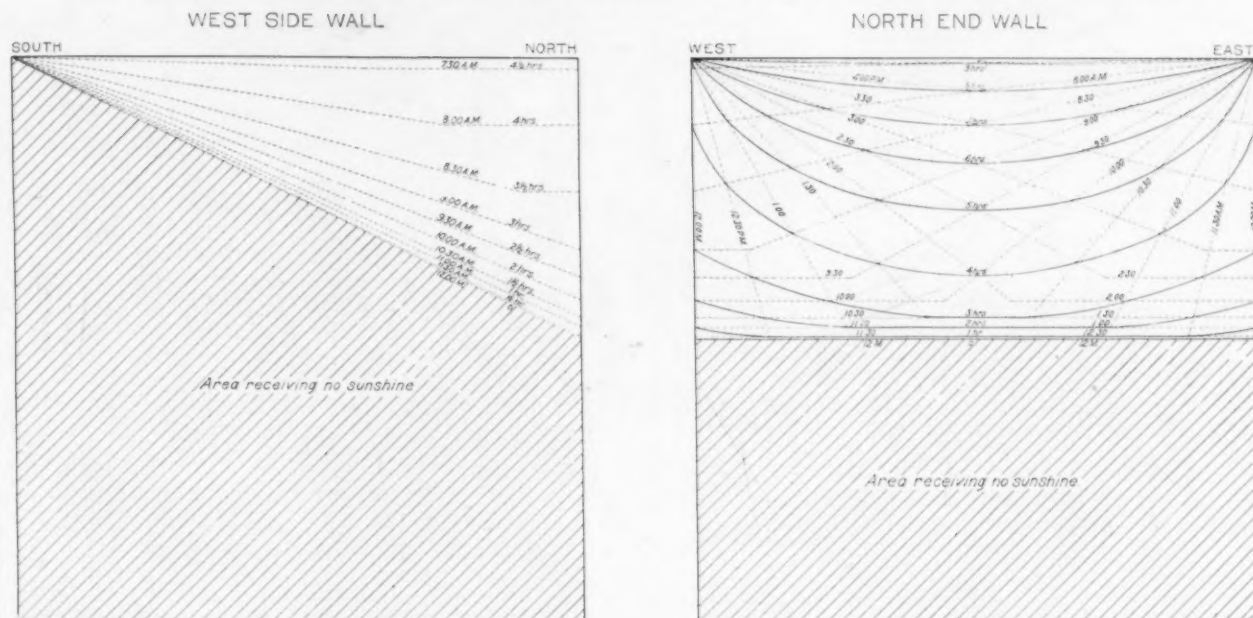


Diagram 9

SUNSHINE IN INNER AND OUTER COURTS, 40° NORTH LATITUDE, WINTER SOLSTICE

Length of Court Oriented North and South

Dimension — 10 feet wide, 20 feet long, 10 feet high

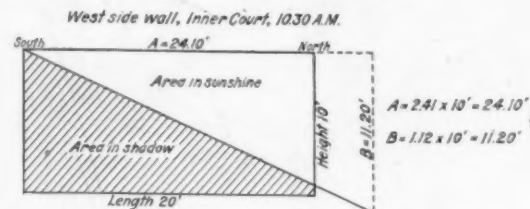


Diagram 2

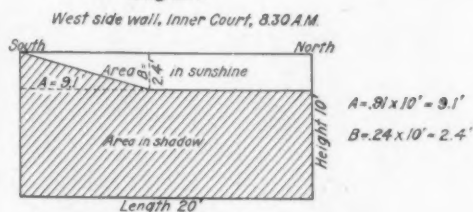


Diagram 3

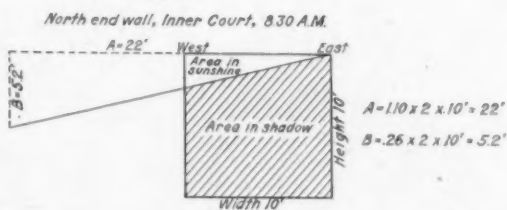


Diagram 4

North end wall, Outer Court, open to south, 10:30 A.M.

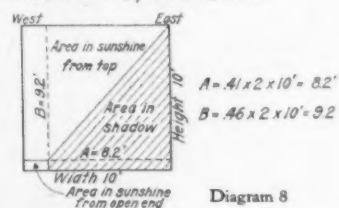


Diagram 8

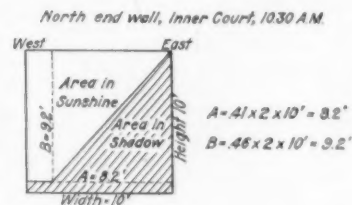


Diagram 5

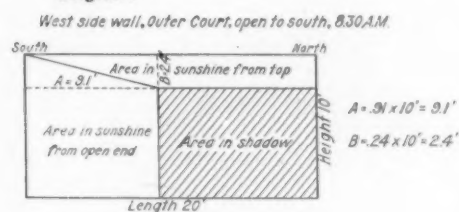


Diagram 6

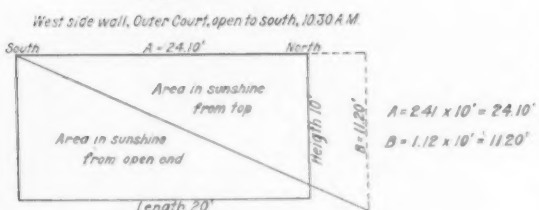


Diagram 7

COORDINATES OF POINTS DEFINING SUNSHINE AND SHADOW IN INNER AND OUTER COURTS AT THE WINTER SOLSTICE

25° North Latitude
LENGTH OF WALL ORIENTED

Time of Day	South		15° W		30° W		45° W		60° W		75° W		West		Time of Day
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
6.44 a.m.	w.s. .48	.00	w.s. .19	.00	w.s. .08	.00	n.s. .35	.00	n.s. .68	.00	n.s. 1.16	.00	n.s. 2.08	.00	5.16 p.m.
7.00	S.E. .52	.05	S.E. .29	.16	N.E. .04	.05	E.E. .25	.05	E.E. .35	.06	E.E. 1.09	.07	E.E. 1.92	.10	5.00
7.30	.60	.18	.36	.27	.15	.15	.16	.16	.35	.17	.54	.21	.66	.29	4.30
8.00	.70	.31	.45	.40	.25	.36	.18	.26	.58	.38	.72	.44	.83	.45	4.00
8.30	.82	.46	.56	.53	.36	.48	.30	.36	.78	.58	.84	.54	.97	.54	3.30
9.00	.95	.64	.70	.69	.50	.60	.40	.46	.86	.78	.94	.62	1.02	.66	3.00
9.30	1.20	.88	.89	.89	.67	.74	.56	.56	.91	.86	.70	.70	.84	.73	2.30
10.00	1.52	1.20	1.15	.89	.60	.91	.34	.34	.75	.66	.50	.50	.66	.79	2.00
10.30	2.05	1.71	1.55	1.51	1.23	1.11	.92	.92	.51	.51	.39	.39	.49	.84	1.30
11.00	3.10	2.67	2.24	2.13	1.73	1.34	1.07	1.07	.38	.38	.19	.19	.32	.86	1.00
11.30	6.24	5.49	3.73	3.43	2.62	2.03	1.00	1.25	.81	.81	.10	.10	.16	.88	12.30
12.00 m.	infinite	infinite	8.52 e.s.	8.52 e.s.	10.72 e.s.	10.72 e.s.	1.85	1.85	1.11	1.11	W.E. 1.10	1.10	W.E. 1.16	1.16	12.00 m.
12.30 p.m.	12 m. 3.10	2.67	12.50 p.m. 5.14	3.94	1.46 p.m. 16.83	11.14	2.90	3.29	1.48	1.48	11.10 a.m. 4.5	4.5	12 m. 49	84	11.30 a.m.
1.00	e.s. 6.24	5.49	e.s. 19.74	16.21	e.s. 16.83	11.14	4.87	5.29	2.08	2.08	1.13	1.00	.66	.79	10.30
1.30	2.05	1.71	3.01	2.10	2.03	1.52	1.85	1.85	1.43	1.43	1.42	1.00	.84	.73	9.30
2.00	1.52	1.20	2.15	1.34	2.03	1.52	1.85	1.85	1.43	1.43	1.42	1.00	.84	.73	8.30
2.30	1.20	.88	1.69	.62	2.03	1.52	1.85	1.85	1.43	1.43	1.42	1.00	.84	.73	7.30
3.00	.82	.46	1.39	.62	2.03	1.52	1.85	1.85	1.43	1.43	1.42	1.00	.84	.73	6.30
3.30	.70	.31	1.19	.40	2.03	1.52	1.85	1.85	1.43	1.43	1.42	1.00	.84	.73	5.30
4.00	.60	.18	1.04	.22	2.03	1.52	1.85	1.85	1.43	1.43	1.42	1.00	.84	.73	4.30
4.30	.52	.05	.92	.15	2.03	1.52	1.85	1.85	1.43	1.43	1.42	1.00	.84	.73	3.30
5.00	.48	.00	.86	.00	2.03	1.52	1.85	1.85	1.43	1.43	1.42	1.00	.84	.73	2.30
5.16															1.30

30° North Latitude
LENGTH OF WALL ORIENTED

Time of Day	South		15° W		30° W		45° W		60° W		75° W		West		Time of Day
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
6.55 a.m.	w.s. .51	.00	w.s. .21	.00	w.s. .06	.00	n.s. .32	.00	n.s. .65	.00	n.s. 1.11	.00	n.s. 1.96	.00	5.05 p.m.
7.00	S.E. .52	.01	S.E. .30	.11	N.E. .04	.01	E.E. .24	.01	E.E. .35	.01	E.E. 1.09	.01	E.E. 1.91	.02	5.00
7.30	.61	.12	.38	.22	.15	.11	.16	.11	.35	.12	.54	.14	.63	.20	4.30
8.00	.72	.25	.48	.33	.20	.20	.18	.20	.58	.22	.81	.26	.81	.34	4.00
8.30	.86	.39	.60	.46	.30	.30	.30	.30	.78	.31	.94	.36	.97	.45	3.30
9.00	1.03	.56	.75	.60	.40	.40	.40	.40	.86	.40	.94	.45	.97	.54	3.00
9.30	1.27	.78	.94	.77	.54	.54	.54	.54	.94	.49	.94	.52	.97	.61	2.30
10.00	1.62	1.07	1.21	.99	.71	.71	.71	.71	.94	.56	.94	.59	.97	.66	2.00
10.30	2.18	1.52	1.61	1.31	.94	.94	.94	.94	.94	.56	.94	.62	.97	.70	1.30
11.00	3.31	2.38	2.30	1.83	1.26	1.17	1.00	1.01	.80	.80	.93	.73	.97	.73	1.00
11.30	6.69	4.93	3.73	2.86	2.54	1.99	1.35	1.23	1.06	1.01	.93	.73	.97	.73	12.30
12.00 m.	infinite	infinite	4.93 e.s.	4.93 e.s.	6.44 e.s.	6.44 e.s.	1.86	1.46	1.86	1.46	.62	.62	W.E. 1.15	1.15	12.00 m.
12.30 p.m.	12 m. 3.31	2.38	12.54 p.m. 5.91	3.78	1.53 p.m. 33.69	18.91	4.23	2.69	4.05	2.50	1.42	1.42	12 m. 46	70	11.30 a.m.
1.00	e.s. 6.69	4.93	e.s. 31.82	21.96	e.s. 33.69	18.91	6.36	3.89	6.36	3.89	1.06	1.06	W.E. 1.15	1.15	11.00
1.30	2.18	1.52	3.33	1.95	3.33	1.95	4.23	2.69	4.05	2.50	1.42	1.42	.62	.66	10.30
2.00	1.62	1.07	2.33	1.22	2.33	1.22	3.89	2.44	3.89	2.44	1.86	1.18	.97	.61	9.30
2.30	1.03	.56	1.80	.80	3.89	2.44	4.05	2.50	4.05	2.50	1.67	.76	.97	.54	8.30
3.00	.86	.39	1.46	.52	3.89	2.44	4.05	2.50	4.05	2.50	1.67	.76	.97	.54	7.30
3.30	.72	.25	1.23	.32	3.89	2.44	4.05	2.50	4.05	2.50	1.67	.76	.97	.54	6.30
4.00	.61	.12	1.05	.15	3.89	2.44	4.05	2.50	4.05	2.50	1.67	.76	.97	.54	5.30
4.30	.52	.01	.92	.01	3.89	2.44	4.05	2.50	4.05	2.50	1.67	.76	.97	.54	4.30
5.00	.48	.00	.86	.00	3.89	2.44	4.05	2.50	4.05	2.50	1.67	.76	.97	.54	3.30
5.05															2.30

COORDINATES OF POINTS DEFINING SUNSHINE AND SHADOW IN INNER AND OUTER COURTS AT THE WINTER SOLSTICE

35° North Latitude

LENGTH OF WALL ORIENTED

Time of Day	South		15° W		30° W		45° W		60° W		75° W		West		Time of Day
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
7:07 a.m.	W.S. 54	.00	W.S. 24	.00	W.S. .02	.00	W.S. 29	.00	W.S. .61	.00	W.S. .95	.00	W.S. 1.83	.00	4:53 p.m.
7:30	S.E. 74	.07	S.E. 40	.06	S.E. 12	.06	S.E. 15	.06	S.E. .53	.07	S.E. .94	.08	E.E. 1.61	.11	4:30
8:00	.89	.31	.80	.26	.21	.24	.15	.15	.33	.25	.66	.28	1.35	.25	4:00
8:30	1.08	.46	.63	.37	.33	.33	.06	.24	.33	.33	.53	.36	1.13	.35	3:30
9:00	1.33	.66	.78	.50	.43	.43	W.E. .04	3.3	.12	.40	.48	.43	.93	.43	3:00
9:30	1.70	.92	.99	.66	.57	.54	W.E. .04	8.49 a.m.	.12	.40	.58	.43	.75	.50	2:30
10:00	2.31	1.33	1.26	.85	.74	.66	W.E. .04	8.49 a.m.	W.E. .12	.53	.77	.48	.59	.54	2:00
10:30	3.51	2.11	1.67	1.12	.97	.80	W.E. .04	8.49 a.m.	W.E. .12	.53	.92	.61	.43	.58	1:30
11:00	infinite	4.33 e.s.	2.36	1.55	1.28	.98	W.E. .04	8.49 a.m.	W.E. .12	.53	1.02	.61	.28	.60	1:00
11:30	infinite	infinite	3.73	2.38	1.73	1.23	W.E. .04	8.49 a.m.	W.E. .12	.53	1.02	.61	.14	.61	12:30 m.
12:00 p.m.	12 m.	3.51	8.14	4.97 e.s.	2.48	1.62	W.E. .04	8.49 a.m.	W.E. .12	.53	1.02	.61	W.E. .14	.61	12:00 m.
1:00	2.31	2.11	6.36	3.65	3.98	2.48	W.E. .04	8.49 a.m.	W.E. .12	.53	1.02	.61	12 m.	.61	11:30 a.m.
2:00	1.70	.92	3.63	1.75	1.58	1.02	W.E. .04	8.49 a.m.	W.E. .12	.53	1.02	.61	.43	.58	11:00
2:30	1.33	.66	2.49	1.06	1.03	.86	W.E. .04	8.49 a.m.	W.E. .12	.53	1.02	.61	.59	.54	10:30
3:00	1.08	.46	1.89	.68	7.03	.84	W.E. .04	8.49 a.m.	W.E. .12	.53	1.02	.61	.75	.50	10:00
3:30	.89	.31	1.52	.43	7.03	.84	W.E. .04	8.49 a.m.	W.E. .12	.53	1.02	.61	.93	.43	9:30
4:00	.74	.19	1.26	.24	7.03	.84	W.E. .04	8.49 a.m.	W.E. .12	.53	1.02	.61	1.13	.35	9:00
4:30	.62	.07	1.07	.08	7.03	.84	W.E. .04	8.49 a.m.	W.E. .12	.53	1.02	.61	1.35	.25	8:30
4:53	.54	.00	1.05	.00	7.03	.84	W.E. .04	8.49 a.m.	W.E. .12	.53	1.02	.61	1.61	.11	8:00
					7.03	.84	W.E. .04	8.49 a.m.	W.E. .12	.53	1.02	.61	1.83	.00	7:30
					7.03	.84	W.E. .04	8.49 a.m.	W.E. .12	.53	1.02	.61			7:07

40° North Latitude

LENGTH OF WALL ORIENTED

Time of Day	South		15° W		30° W		45° W		60° W		75° W		West		Time of Day
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
7:22 a.m.	W.S. 59	.00	W.S. 28	.00	W.S. .01	.00	W.S. 25	.00	W.S. .56	.00	W.S. .98	.00	W.S. 1.68	.00	4:38 p.m.
7:30	S.E. 76	.12	S.E. 41	.10	S.E. 12	.10	S.E. 14	.10	S.E. .53	.02	S.E. .78	.12	E.E. 1.60	.03	4:30
8:00	.91	.24	.52	.19	.22	.18	W.E. .05	.25	.32	.18	.64	.21	E.E. 1.32	.16	4:00
8:30	1.11	.37	.65	.30	.33	.33	W.E. .05	.25	.21	.25	.51	.28	1.10	.26	3:30
9:00	1.39	.54	.82	.41	.45	.45	W.E. .05	.25	.10	.32	.38	.34	.90	.34	3:00
9:30	1.78	.77	1.02	.54	.59	.54	W.E. .05	.25	W.E. .01	.38	.25	.39	.72	.39	2:30
10:00	2.41	1.12	1.30	.70	.77	.54	W.E. .05	.25	W.E. .01	.38	.13	.43	.56	.43	2:00
10:30	3.68	1.78	1.72	.93	.99	.66	W.E. .05	.25	W.E. .01	.38	.00	.47	.41	.46	1:30
11:00	infinite	3.72 e.s.	2.40	1.28	1.30	.81	W.E. .05	.25	W.E. .01	.38	.13	.43	.27	.48	1:00
11:30	infinite	infinite	3.73	1.93	1.73	1.00	W.E. .05	.25	W.E. .01	.38	.13	.43	.13	.50	12:30 m.
12:00 p.m.	12 m.	3.68	8.14	4.97 e.s.	2.48	1.62	W.E. .05	.25	W.E. .01	.38	.13	.43	W.E. .13	.50	12:00 m.
1:00	2.31	2.11	6.36	3.65	3.98	2.48	W.E. .05	.25	W.E. .01	.38	.13	.43	12 m.	.50	11:30 a.m.
2:00	1.78	.77	3.92	1.53	3.78	1.29	W.E. .05	.25	W.E. .01	.38	.13	.43	.41	.46	11:00
2:30	1.39	.54	2.63	.89	3.78	.83	W.E. .05	.25	W.E. .01	.38	.13	.43	.56	.43	10:30
3:00	1.11	.37	1.97	.55	3.78	.83	W.E. .05	.25	W.E. .01	.38	.13	.43	.72	.39	10:00
3:30	.91	.24	1.58	.32	3.78	.83	W.E. .05	.25	W.E. .01	.38	.13	.43	.90	.34	9:30
4:00	.76	.12	1.26	.16	3.78	.83	W.E. .05	.25	W.E. .01	.38	.13	.43	1.10	.26	9:00
4:30	.62	.07	1.07	.08	3.78	.83	W.E. .05	.25	W.E. .01	.38	.13	.43	1.32	.16	8:30
4:58	.59	.00	1.02	.00	3.78	.83	W.E. .05	.25	W.E. .01	.38	.13	.43	1.60	.03	8:00
					3.78	.83	W.E. .05	.25	W.E. .01	.38	.13	.43	1.85	.00	7:30
					3.78	.83	W.E. .05	.25	W.E. .01	.38	.13	.43			7:22

COORDINATES OF POINTS DEFINING SUNSHINE AND SHADOW IN INNER AND OUTER COURTS AT THE WINTER SOLSTICE

45° North Latitude

LENGTH OF WALL ORIENTED

Time of Day	South	15° W	30° W	45° W	60° W	75° W	West	Time of Day
7.38 a.m.	A	A	A	A	A	A	A	4.22 p.m.
8.00	B	B	B	B	B	B	B	4.00
8.30	A	A	A	A	A	A	A	3.30
9.00	B	B	B	B	B	B	B	3.00
9.30	A	A	A	A	A	A	A	2.30
10.00	B	B	B	B	B	B	B	2.00
10.30	A	A	A	A	A	A	A	1.30
11.00	B	B	B	B	B	B	B	1.00
11.30	A	A	A	A	A	A	A	12.30 m.
12.00 m.	B	B	B	B	B	B	B	12.00 m.
12.30 p.m.	A	A	A	A	A	A	A	11.30 a.m.
1.00	B	B	B	B	B	B	B	11.00
1.30	A	A	A	A	A	A	A	10.30
2.00	B	B	B	B	B	B	B	10.00
2.30	A	A	A	A	A	A	A	9.30
3.00	B	B	B	B	B	B	B	9.00
3.30	A	A	A	A	A	A	A	8.30
4.00	B	B	B	B	B	B	B	8.00
4.22	A	A	A	A	A	A	A	7.38

50° North Latitude

LENGTH OF WALL ORIENTED

Time of Day	South	15° W	30° W	45° W	60° W	75° W	West	Time of Day
8.00 a.m.	A	A	A	A	A	A	A	4.00 p.m.
8.30	B	B	B	B	B	B	B	3.30
9.00	A	A	A	A	A	A	A	3.00
9.30	B	B	B	B	B	B	B	2.30
10.00	A	A	A	A	A	A	A	2.00
10.30	B	B	B	B	B	B	B	1.30
11.00	A	A	A	A	A	A	A	1.00
11.30	B	B	B	B	B	B	B	12.30 m.
12.00 m.	A	A	A	A	A	A	A	12.00 m.
12.30 p.m.	B	B	B	B	B	B	B	11.30 a.m.
1.00	A	A	A	A	A	A	A	11.00
1.30	B	B	B	B	B	B	B	10.30
2.00	A	A	A	A	A	A	A	10.00
2.30	B	B	B	B	B	B	B	9.30
3.00	A	A	A	A	A	A	A	9.00
3.30	B	B	B	B	B	B	B	8.30
4.00	A	A	A	A	A	A	A	8.00

COORDINATES OF POINTS DEFINING SUNSHINE AND SHADOW IN INNER AND OUTER COURTS AT THE WINTER SOLSTICE

55° North Latitude

LENGTH OF WALL ORIENTED

Time of Day	South	15° W	30° W	45° W	60° W	75° W	West	Time of Day
8.25 a.m.	A	A	A	A	A	A	A	3.32 p.m.
8.30	S.E. 1.48	S.E. .53	S.E. .24	S.E. .04	S.E. .31	S.E. .63	S.E. .108	3.30
9.00	1.17	.54	.35	.03	.19	.48	.106	3.00
9.30	1.48	.69	.49	.08	.07	.35	.08	2.30
10.00	1.92	.87	.64	.19	.04	.22	.11	2.00
10.30	2.63	1.09	.81	.31	.13	.10	.18	1.30
11.00	4.02	1.38	.81	.45	.17	.02	.19	1.00
11.30	8.12	1.81	1.04	.60	.29	.14	.20	12.30
12.00 m.	infinite	2.47	1.33	.78	.42	.27	.21	12.00 m.
1.00	12 m. 4.02	3.73	1.73	1.00	.58	.40	.20	11.30 a.m.
1.30	8.12	7.13	2.36	1.28	.75	.55	.25	11.00
2.00	1.92	55.44	3.48	1.66	.96	.72	.38	10.30
2.30	1.48	e.s. 9.79	6.20	2.23	.26	.92	.18	10.00
3.00	1.17	1.05 p.m. 4.49	1.03 9.49 a.m.	3.18	.19	.116	.11	9.30
3.30	.94	.12	e.s. 13.89	4.4	.25	.14	.09	9.00
3.32	.93	.00 w.s.	2.11 p.m. 5.40	12.71	.15	1.86	.01 E.E.	8.30
	A	A	A	s.s. 33.37	.40	1.90	.08	8.28
	South	15° E	30° E	45° E	60° E	75° E	East	

60° North Latitude

LENGTH OF WALL ORIENTED

Time of Day	South	15° W	30° W	45° W	60° W	75° W	West	Time of Day
9.08 a.m.	A	A	A	A	A	A	A	2.52 p.m.
9.30	S.E. 1.48	S.E. .73	S.E. .39	S.E. .11	S.E. .16	S.E. .44	S.E. .80	2.30
10.00	1.93	1.10	.64	.32	.07	.34	.03	2.00
10.30	2.66	1.40	.82	.45	.06	.22	.06	1.30
11.00	4.07	1.82	1.04	.61	.12	.10	.08	1.00
11.30	8.24	2.49	1.33	.78	.14	.11	.12	12.30
12.00 m.	infinite	3.73	1.73	1.00	.17	.43	.12	12.00 m.
1.00	12 m. 4.07	7.04	2.35	1.28	.14	.58	.14	11.30 a.m.
1.30	8.24	4.77	3.44	1.65	.20	.96	.14	11.00
2.00	1.93	e.s. 10.17	6.05	2.21	.13	1.22	.25	10.30
2.30	1.48	1.05 p.m. 4.57	21.47	3.14	.19	.91	.08	10.00
2.52	1.24	.00 w.s.	e.s. 14.42	5.13	.14 E.E.	1.15	.03 E.E.	9.30
	A	A	A	9.23	.00 n.s.	1.37	.80	9.08
	South	15° E	30° E	45° E	60° E	75° E	East	

4. THE SIDE WALL OF AN OUTER COURT.

The area of a side wall of an outer court in sunshine is determined by identically the same coordinates as for an inner court.

The area receiving sunshine through the top is defined in the same manner as in an inner court. The additional area receiving sunshine through the open end is defined by drawing a vertical line from the point fixed by the coordinates in ascertaining the area illuminated through the top to the bottom of the court. The added area in sunshine is that between this vertical line and the open end (Diagram 6). If the point fixed by the coordinates should in the case of an outer court opening toward the sun fall outside the face of the side wall considered, there is no occasion for drawing either the horizontal or the vertical line as the entire wall is then in sunshine (Diagram 7). If the closed end of the court is toward the sun, the shadow lines are the same as for an inner court.

5. THE END WALL OF AN OUTER COURT.

The coordinates are plotted in the same manner for the end wall of an outer court as for an inner court.

When the open end of the outer court faces the sun and the point fixed by the coordinates for the end wall falls outside the wall, only so much of the wall as is above the diagonal line drawn from this point to the upper corner nearest the sun receives sunshine. When the point fixed by the coordinates, however, falls on the end wall, an area in addition to that situated above the diagonal line receives sunshine. This additional area is the surface of the end wall between a vertical line drawn through the point fixed by the coordinates and the side wall at that time furthest from the sun (Diagram 8). When the closed end of the outer court faces the sun, the end wall of the outer court is entirely in shadow.

6. THE INTERIOR OF A ROOM.

The portion of a wall within a room illuminated by sunshine entering a window is determined in the same manner as that for the corresponding wall of an outer court receiving sunshine through the open end. The width of the court is taken as the distance between the edge of the window nearest the sun and the opposite wall of the room at that time furthest from the sun; the height of the court as the height of the top of the window above the floor; the length of the court as the depth of the room from the window surface. The coordinates A and B when plotted on the wall furthest from the sun — A as the distance in from the window, and B as the distance down from the upper edge of the window — give the point in sunshine from the upper corner of the window near-

est the sun. Similarly coordinates for the same court diminished in width by the width of the window will give the point in sunshine from the upper corner of the window furthest from the sun. Vertical lines dropped from each of these two points, of a length equal to the height of the window opening, determine the points in sunshine from the two lower corners of the window. The portion of the wall enclosed by lines connecting these four points is the area at that time in sunshine from the whole window opening. Of course, some of these points may fall outside the wall in the room at right angles to the window. This simply means that part of the possible sunshine on an indefinitely extended wall strikes the floor or the wall opposite the window. The portion of the wall opposite the window in sunshine at any particular time is obtained in the same manner as that of an end wall in an outer court.

It has been assumed above that the window opening is effective to the edge of the glass. This condition is true only where the wall in which the window is set has no appreciable thickness. When the sunshine falling on a particular wall in a room is limited, not by the edge of the glass, but by the sides of the window opening, or by obstructing walls either inside or outside the room, the coordinates should be plotted for a court, the dimensions of which are determined not by the edge or surface of the window pane, but by the edge and distance of such obstructing wall.

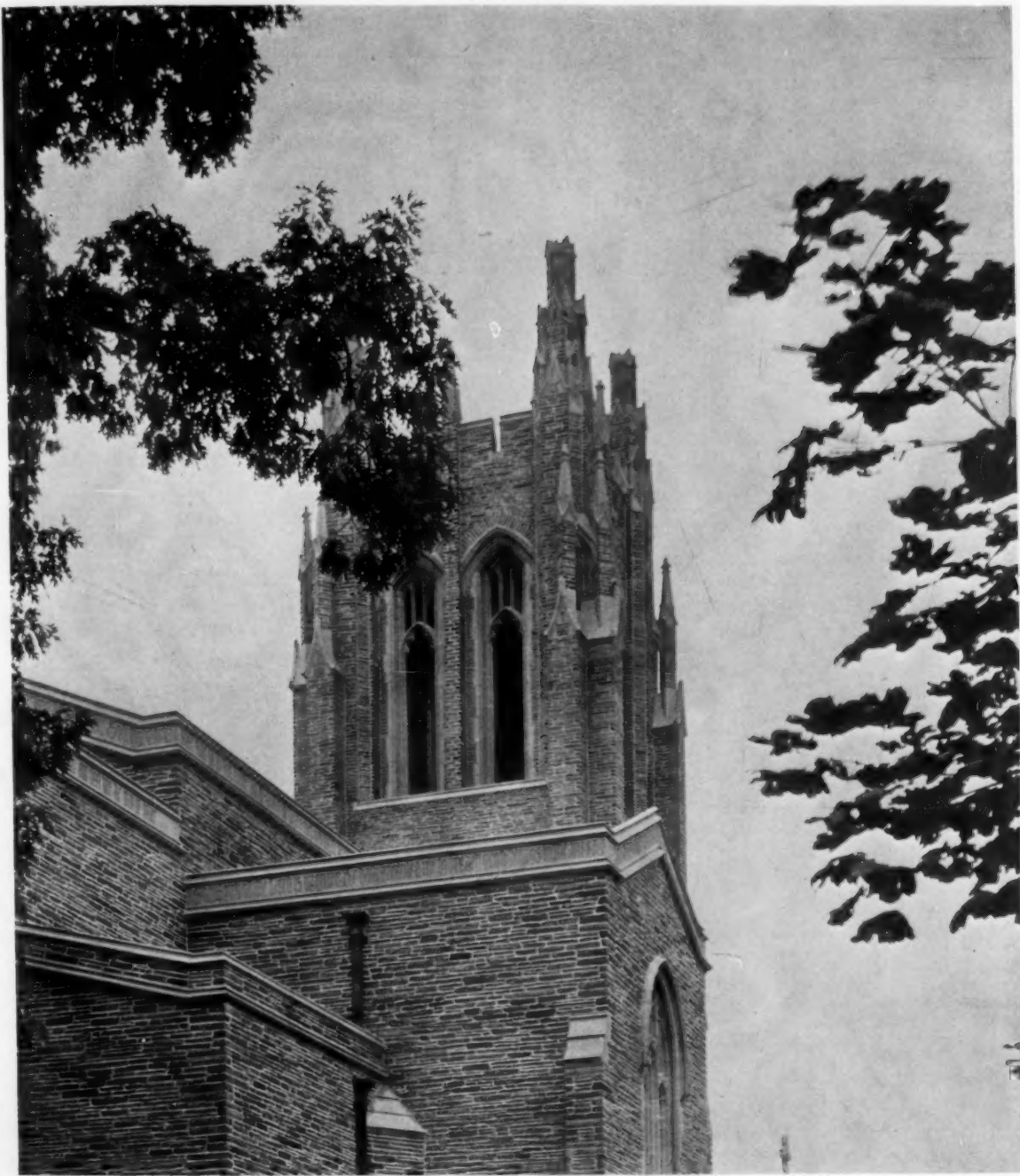
NEED FOR SUNLIGHT ENGINEERING.

Sunlight engineering has in the past been all but wholly ignored in city planning. The width and arrangement of streets, the length and breadth of lots, and the size of blocks have all been fixed without the slightest reference to latitude or sun. And so it has been in housing, too. The height of buildings, the size and thickness of window openings, the depth of rooms, and the least dimension of courts and yards have generally been determined without any consideration of the fact that the altitude of the sun varies not only during each day of the year, but during each moment of the day. From the way cities are planned and houses built one would never know that the sun described during half the year less than half a circle in its orbit through the sky. Both the street plan and the building plan of many a city would suggest that the inhabitants were under the illusion that sunlight was equally available in all directions.

The low sun and the short day are the two great natural disabilities of a northern latitude in winter. These two disadvantages may, to a large extent, be overcome by the application of sunlight engineering in city planning and housing.

THE FORUM COLLECTION OF
MODERN GOTHIC ARCHITECTURAL DETAILS

PLATE FIVE



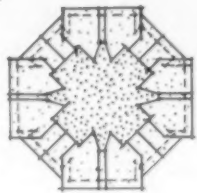
A FREE rendering of Gothic precedent in simple forms, particularly fortunate in its pleasing contour of mass and fine relation of scale between tracery,

mouldings, and units of masonry wall. An interesting use of inscriptions as a decorative motif is shown on the facia beneath the gable copings.

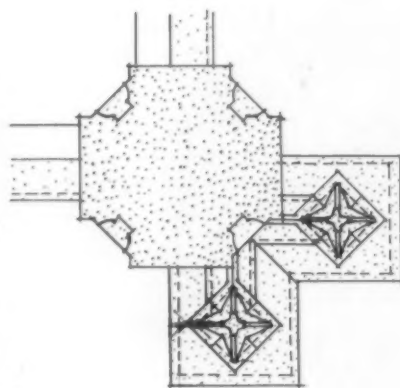
DETAIL OF UPPER PORTION OF TOWER, CHURCH OF THE EPIPHANY
SHERWOOD, WEST PHILADELPHIA, PA.

DAY & KLAUDER AND E. E. HENDRICKSON, ASSOCIATED ARCHITECTS

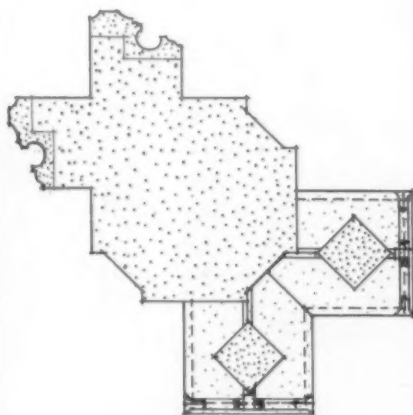
DETAIL DRAWING BY ROBERT A. TAYLOR ON FOLLOWING PAGE



PLAN AT A



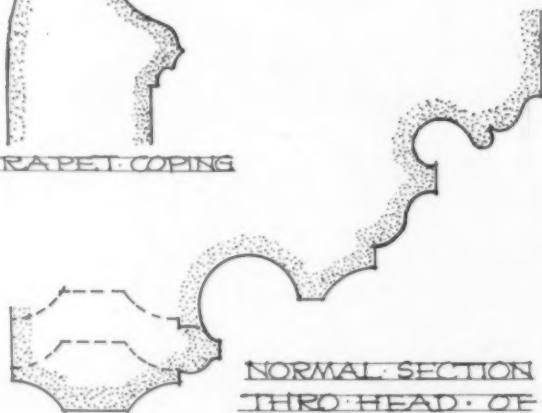
PLAN AT B



PLAN AT C



PARAPET COPING



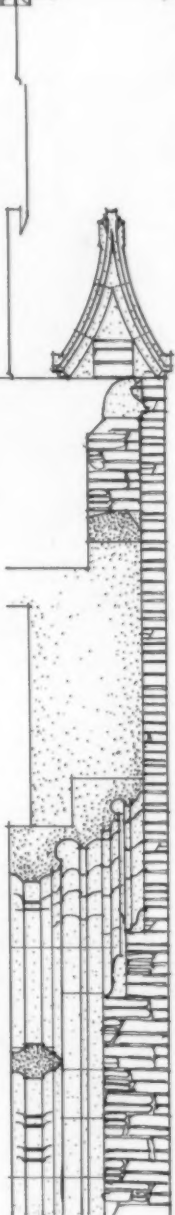
NORMAL SECTION
THRO HEAD OF
WINDOW



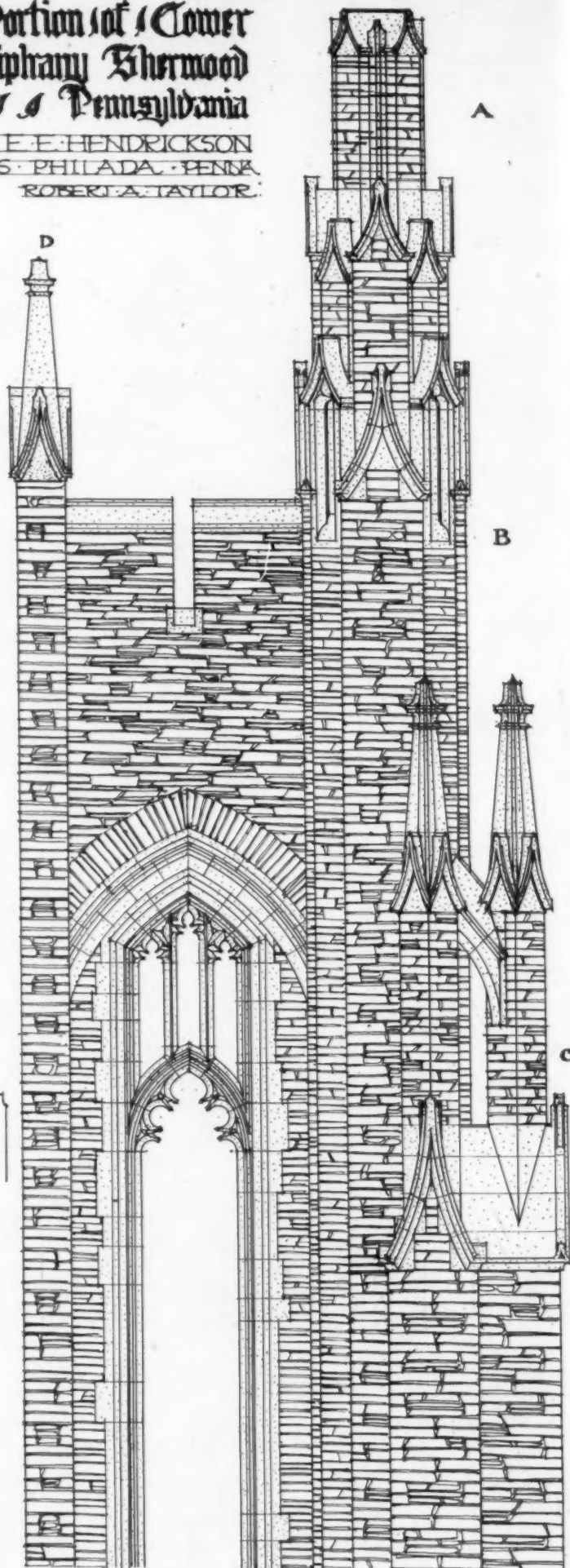
Details of Upper Portion of Tower Church of the Epiphany Sherman West Philadelphia Pennsylvania DAY AND KLAUDER F F HENDRICKSON ASSOCIATED ARCHITECTS PHILADA PENNA DRAWN BY ROBERT A TAYLOR



D



SECTION



ELEVATION

Yorkship Village

A DEVELOPMENT FOR THE NEW YORK SHIPBUILDING CORPORATION, CAMDEN, N. J.

ELECTUS D. LITCHFIELD, ARCHITECT

By CHARLES C. MAY

NOW that the Federal Government of the United States has definitely accepted the challenge offered by the combination of low speed production and universal shortage of houses, nothing can exceed in interest for students of the subject the working out in practice of the relation of the governmental sponsor to the villages over which it has assumed temporary guardianship. It must be worked out in practice because the Federal authority has thus far wished to avoid direct ownership or landlordism, and the specific terms of participation by the Government in the provision of industrial villages, and later withdrawal from the administration of them, are matters not as yet fully explored or proven.

One of the earliest opportunities for observing the workings of the newly constructed machine will be afforded by the progress of the industrial development called Yorkship Village, which adjoins the city of Camden, N. J.

The industry which calls this village into being is that of the New York Shipbuilding Corporation, one of the largest of the plants along the water fronts of the entire country. While the new housing development is legally a part of the city of Camden, it is physically a self-contained unit of population, lying outside the built-up portion of the present city; while the Government of the United States is legally the holder of a controlling interest in the property (since, as lender of most of the money, it holds a mortgage over the development), the active care and responsibility for the construction and immediate administration of the village is vested in the Fairview Realty Company, an organization formed for the purpose.

This company's dividends are permanently limited to 5 per cent, but it must first pay to the United



Street View Showing Single House Types

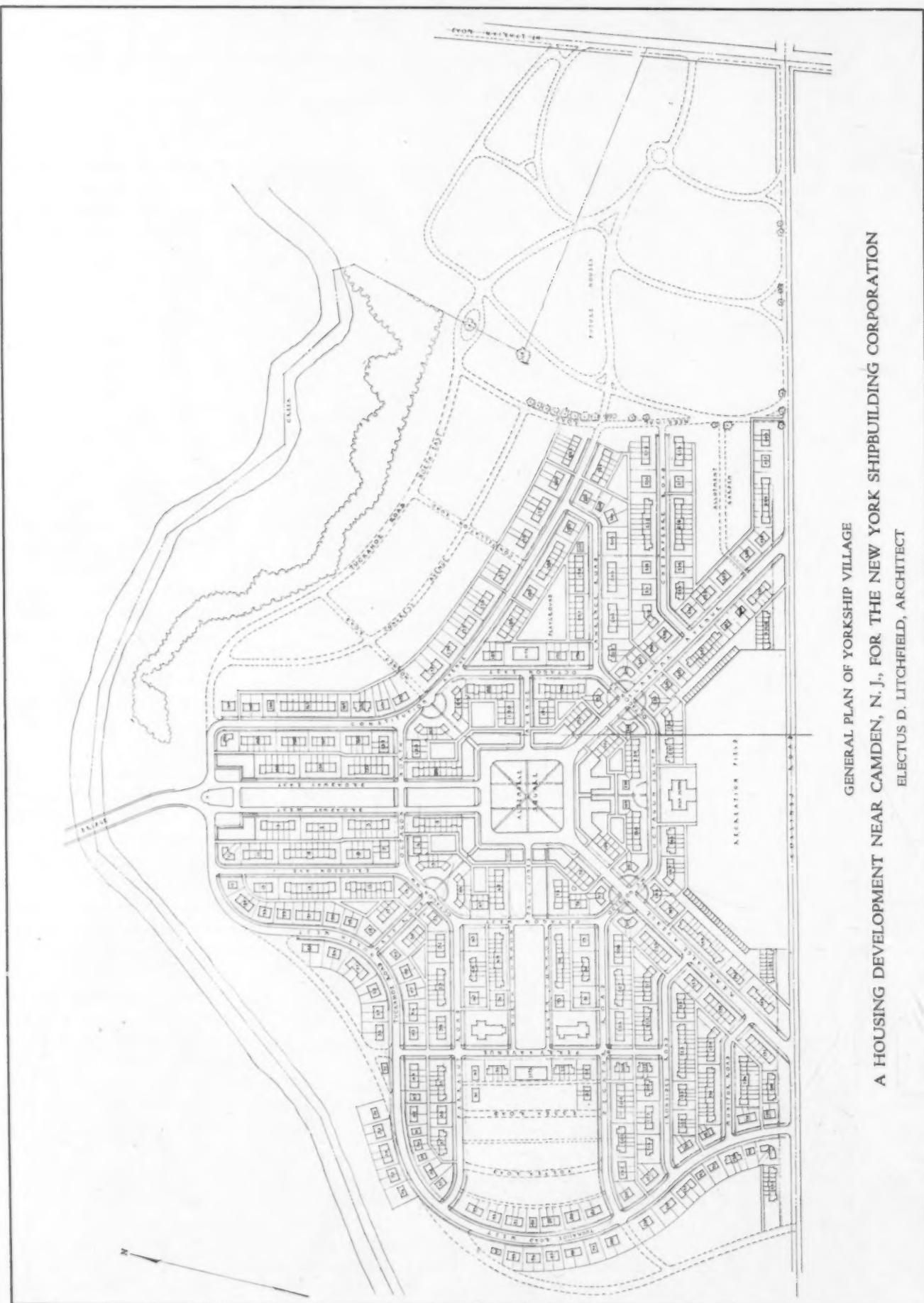
States 5 per cent interest on its loan, plus 3 per cent payment on the principal. In view of the conditions under which building is carried on, it is hardly to be expected that the project will be able to meet all its obligations for a considerable period after the war. Provision is made, therefore, for an appraisal to be made at a reasonable time after the close of hostilities, at which time the Government is prepared to absorb if necessary a good share of the excess cost, due to abnormal conditions as a war charge, thereby setting the project once more on its own feet, on a

fair competitive basis, with other ventures born under more favorable circumstances.

In the meantime the company is permitted to sell houses to individuals—in fact, it is rather encouraged to do so, since the proceeds from such sales are credited as part of the amortization charges.

As architect for the development, the company selected Mr. Electus D. Litchfield of New York. He is also responsible for the general plan of the village; while the engineering features, such as water supply, sewerage, gas, etc., are in charge of Lockwood, Green & Company. Mr. Litchfield began active work on the project during the first week of February. At present writing (the first week in June) much of the foundation work is in place, and brickwork is getting under way.

The photographs reproduced herewith show how fortunate the new village has been in its natural setting. Within walking distance of the shipbuilding plant, it is separated by the winding stream known as Newton Creek. It gains thus the important asset of definition at its boundary line, without losing, as is usually the case, the close relation between living and working quarters of its citizens. A third side of the town (the stream really borders two of them) is bounded by a highway which forms the main con-



necting link by road to the city of Camden. On the fourth side there is a tract of land as yet unoccupied, similar in character to that now being developed, and in this direction lies the outlet for future expansion. It may be assumed that this feature has not been lost sight of in the disposition of the main arteries of traffic in the present town plan.

The area selected for immediate subdivision comprises some 200 acres of moderately rolling country side, of which a little less than half will be developed at once. The land has an elevation above the high water of the creek of about 10 feet and is thus reasonably free from any danger from overflow. It has also sufficient height to allow the use of cellars without the necessity of expensive waterproofing. There are numerous fine old trees and hedgerows along the existing country lanes, and, it goes without saying, that these, the principal natural feature of the landscape, are being preserved with greatest care. Besides this scattered growth over the whole area there is a considerable belt of woods skirting the creek along the part reserved for the higher grade residential section. This, being somewhat low lying, is to be developed and reserved for a park border for that entire side of the town.

Reservations such as this are an expression of the zoning principle on which the town plan is based. The anatomy of the structure is peculiarly simple, since the main access to the plant is by bridge over the river, and this thoroughfare thus becomes at once the main artery of the whole circulatory system. Its focus is the village square, devoted to business buildings, and the adjoining common, where are to be

grouped the public and semi-public buildings of the town. Beyond, the plan shows the high school and its athletic field, to the east the area of less expensive dwellings, and at the opposite side of the town, the higher grade residential district. This latter section is not included in the program for immediate development, nor have the civic features aside from the buildings around Albemarle Square been definitely determined and located, but tentative provision has been made for them as a part of the town plan, in order that the ultimate result may be properly unified.

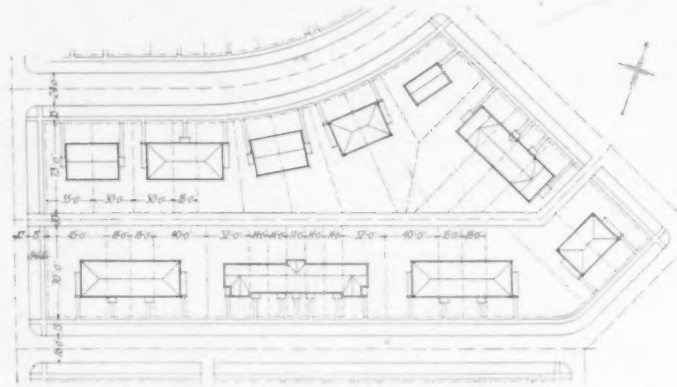
The village green, "Albemarle Square," as it

has been named, is an open space about 320 by 320 feet — a modest size compared with some of the civic centers planned or projected. It is being carefully studied with a view toward producing not only an enclosed area which may well serve for the utility of town business and commerce, but may also possess the virtue

of good composition, variety, and architectural dignity.

As the perspectives indicate, the general character of this square and the common will be reminiscent of some of the best of our New England towns. Mr. Litchfield has aimed, while not sacrificing any of the advantages of collective planning, to give this square, and indeed the whole village, the feeling of a town which has grown through a period of years, rather than that of one which has sprung full grown from the earth, without traditions or reminiscences of a long-past youth.

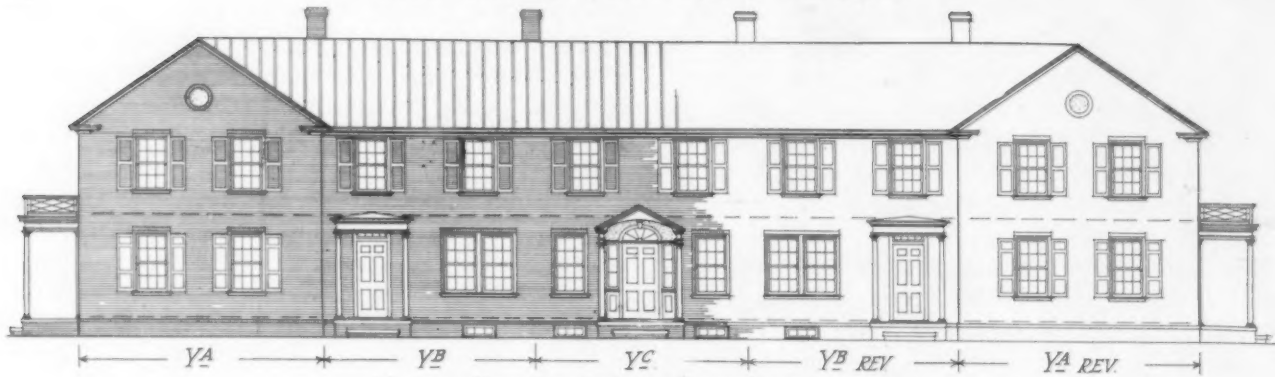
A study of the town plan shows that local tradition has been respected in matters of street system, lotting, etc. The streets are comparatively wide, ranging,



Plan of a Typical Block Showing Lot Arrangement



Two Views on the Site of Yorkship Village

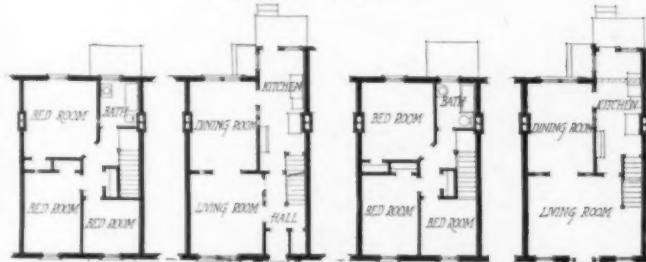


Elevation of Five-Family House Composed of Typical Units

with one or two exceptions, from 50 feet up to a maximum, in case of Broadway, the main axial thoroughfare, of 124 feet. These widths provide, in even the minor residential streets, for ample spaces for planting, especially since the roadways themselves are kept to moderate widths of 24 or 32 feet. The use of the alley system is due partly to local preference, but more to the need of providing convenient access to the



FLOOR PLANS OF TYPE YA



FLOOR PLANS OF TYPE YB

FLOOR PLANS OF TYPE YC

Floor Plans of Types in Group House Below

rears of all houses in a community, the great majority of whose dwellings are in groups. Even so, one can hardly avoid grudging this 12 feet of space at the rear lines of lots which average not more than 70 feet and are in some cases even less.

As we have said, the great majority of the 907 houses now under contract are in groups. These reach a maximum length of eleven units, while at the other end of the scale there are



Perspective View of Group of Five Houses

triple units, semi-detached houses, and some few single-family detached dwellings. Of these latter there will be a much larger proportion in the residential section reserved for later development.

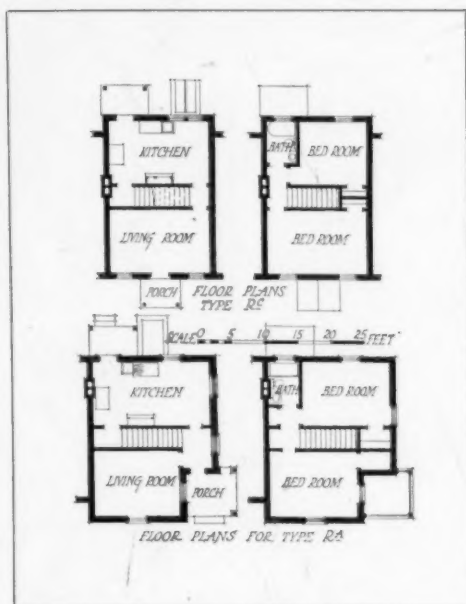
The houses themselves are of numerous types, which divide themselves among the four, five, six, and seven room classes. They are planned on the most straightforward lines, nearly all of full two story height, the large group units making this architecturally possible. This fact is also advantageous in allowing simplest roofing and framing everywhere.

In cases such as this, where the time element in producing plans as well as in construction is of the essence, the procedure in designing and getting out drawings for the many different groups is both novel and ingenious. First, units for the various types were drawn out in plan and elevation as working drawings, modifying them as necessary to make them suitable for terminal or intermediate motives. These typical elevations were then photographed, and many prints of each struck off. Each of these tiny elements then became one of a series of motives which could be readily and flexibly grouped into compositions to fit any conditions presented by the town plan. These built-up groups are again photographed, and the resulting prints, taken in connection with the typical large-scale plans, become the working drawings for the groups. Very few short cuts to architectural creation

have proved acceptable in the long run; but for cases where repetition of elements in varying combinations is an essential process of design, this method of speeding up the purely mechani-



Elevation of Three-Family House



Floor Plans of Typical Units in Group House Shown Above

cal part of the process appears to have worked out successfully in this case and to be of value to others who are confronting similar problems in architectural quantity production.

For the houses themselves, Mr. Litchfield, pursuing

the idea of creating a flat village which may have the quality of a grown-up one, is using a variety of constructions and materials. This has the advantage also of drawing upon several material markets, instead of tending to exhaust one or two. Thus, while the majority of the houses will be of brick exterior, there will also be numbers of them built of stucco on metal lath and stud, as well as some of ordinary frame construction. For use on many of the roofs, Mr. Litchfield has devised a use of slate surfaced, asphalt roofing in rolls, but laid on the roofs by turning it up and over raised batten strips after the manner of tin roofs. This method of

laying should give scale and interest to a roof which has hitherto had the merits of durability and economy.

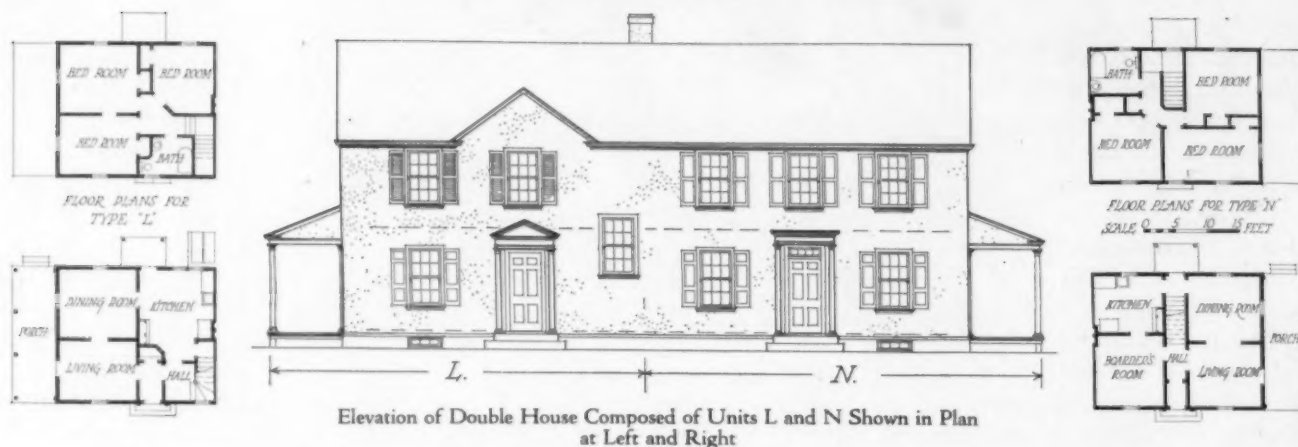
All houses have accommodations of bathrooms, electric light, gas, and heat from hot air furnaces. The latter are complete installations with ducts carried to each room.

It is greatly to be regretted that at the moment no schedule of costs for either house construction or public utilities can be made available. General estimates were taken, to be sure, in mid-winter, and it

may be said that the house units then averaged about \$2,700 in cost. This average cost represented the structure alone and took no account of land, street improvements nor utilities and

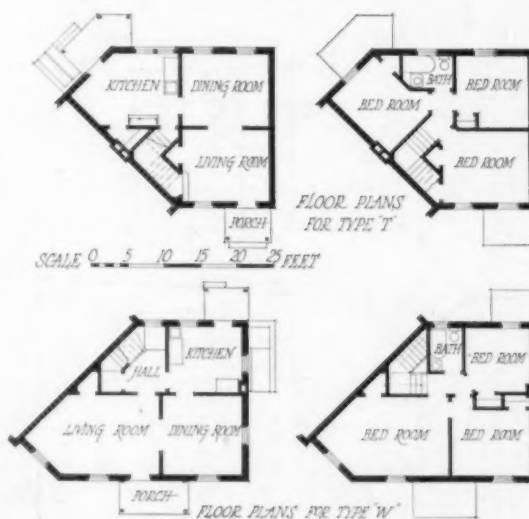


Elevation of Three-Family House with Flat Roof



overhead. The contract under which they will be built is based upon cost plus a fixed sum for the contractor's profit. This fixed sum is well below the proportionate limit allowed in the cantonment work for the contractor's percentage.

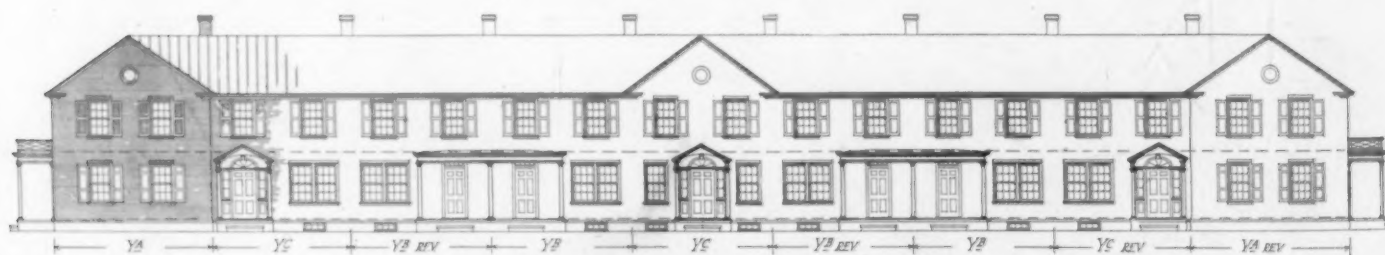
The completion date under the first contract falls in September, so that early next fall we should be able to point to a phenomenon new in our national life—some 1,400 workmen, constituting, with their families, a town of 5,000 persons, living under conditions which the National Government alone has been able to bring about. We have in York-ship Village an entire town carried out in a homogeneous architectural treatment that promises to possess great charm, a town plan following the zoning system which should operate to control future development in a manner that will ensure protection to the home districts, and distinct natural advantages in the way of definite boundaries, removing the pos-



Plans for External and Internal 45° Angle Houses

sibility of unrestricted commercial development on the outskirts to take advantage of the newly created values. These conditions are new among American towns, and, what is of greater importance, the method of operation imposed by the Government because of its financial aid, which will be maintained even after the realty corporation's indebtedness to the Government has been discharged, assures that any earnings of the property over and above the

limited dividends allowed will be expended in further improvement of the development. The opportunity for the individual to live in surroundings of decency and amenity, so often denied to the man without financial backing, becomes now a matter of national policy. It is in the broadening of our outlook as a people toward this and allied questions that men see greatest signs of promise at the present moment, and it is as a contribution toward this end that Mr. Litchfield's accomplishment at Camden is of greatest significance.

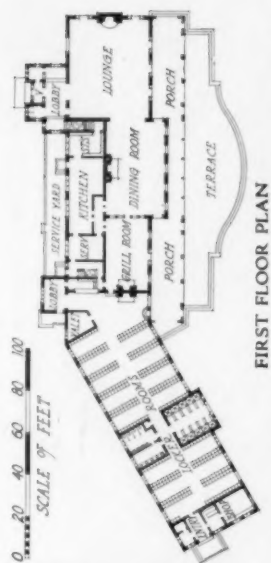


Elevation of Nine-Family Group House Composed of Typical Units



DETAIL OF MAIN ENTRANCE
BOB-O-LINK GOLF CLUB, HIGHLAND PARK, ILL.
BROWN & WALCOTT, ARCHITECTS

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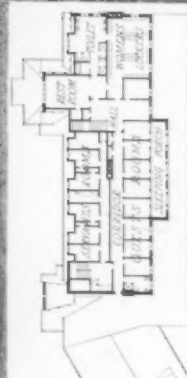
FIRST FLOOR PLAN



GENERAL VIEW FROM THE LINKS

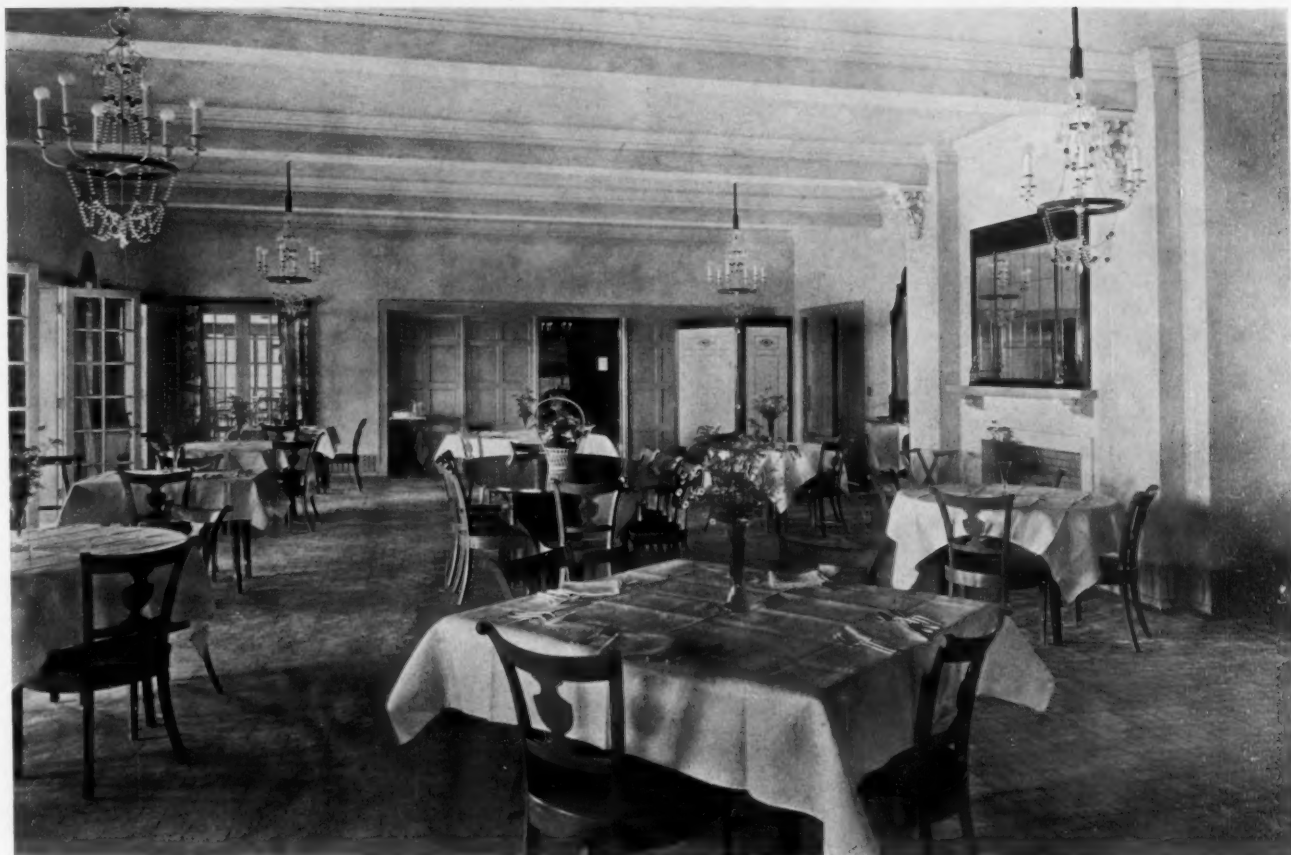
BOB O-LINK GOLF CLUB, HIGHLAND PARK, ILL.

BROWN & WALCOTT, ARCHITECTS



SECOND FLOOR PLAN

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VIEW OF DINING ROOM



VIEW OF LOUNGE

BOB-O-LINK GOLF CLUB, HIGHLAND PARK, ILL.

BROWN & WALCOTT, ARCHITECTS

20



GENERAL VIEW

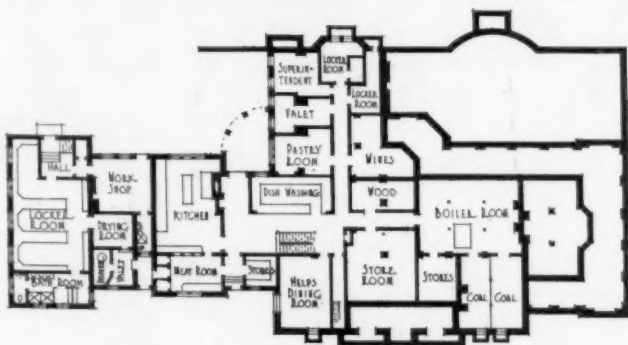
ESSEX COUNTY CLUB, MANCHESTER-BY-THE-SEA, MASS.

PARKER, THOMAS & RICE, ARCHITECTS

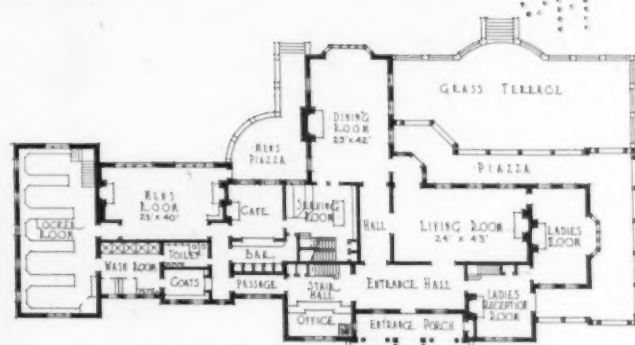
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DETAIL OF MAIN ENTRANCE



BASEMENT PLAN

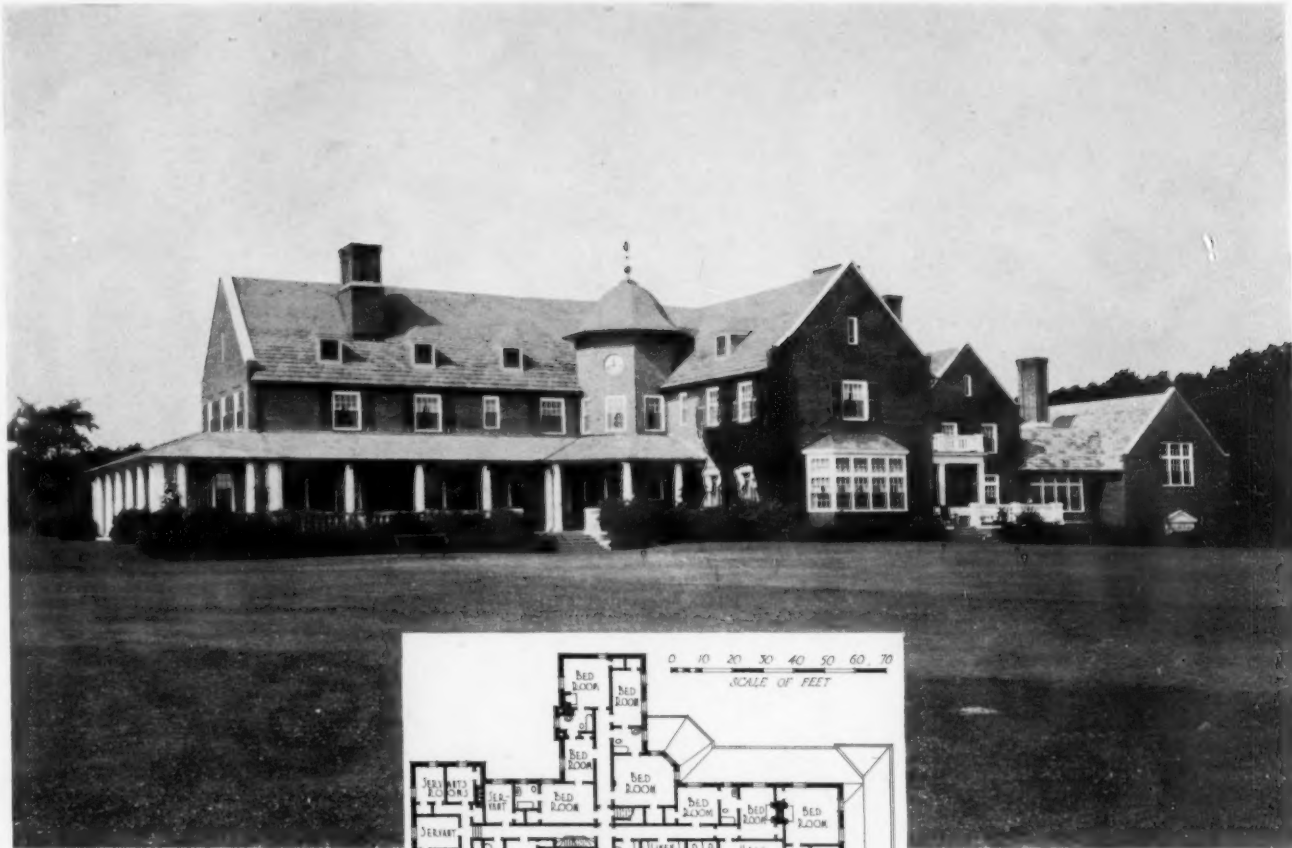


FIRST FLOOR PLAN

ESSEX COUNTY CLUB, MANCHESTER-BY-THE-SEA, MASS.

PARKER, THOMAS & RICE, ARCHITECTS

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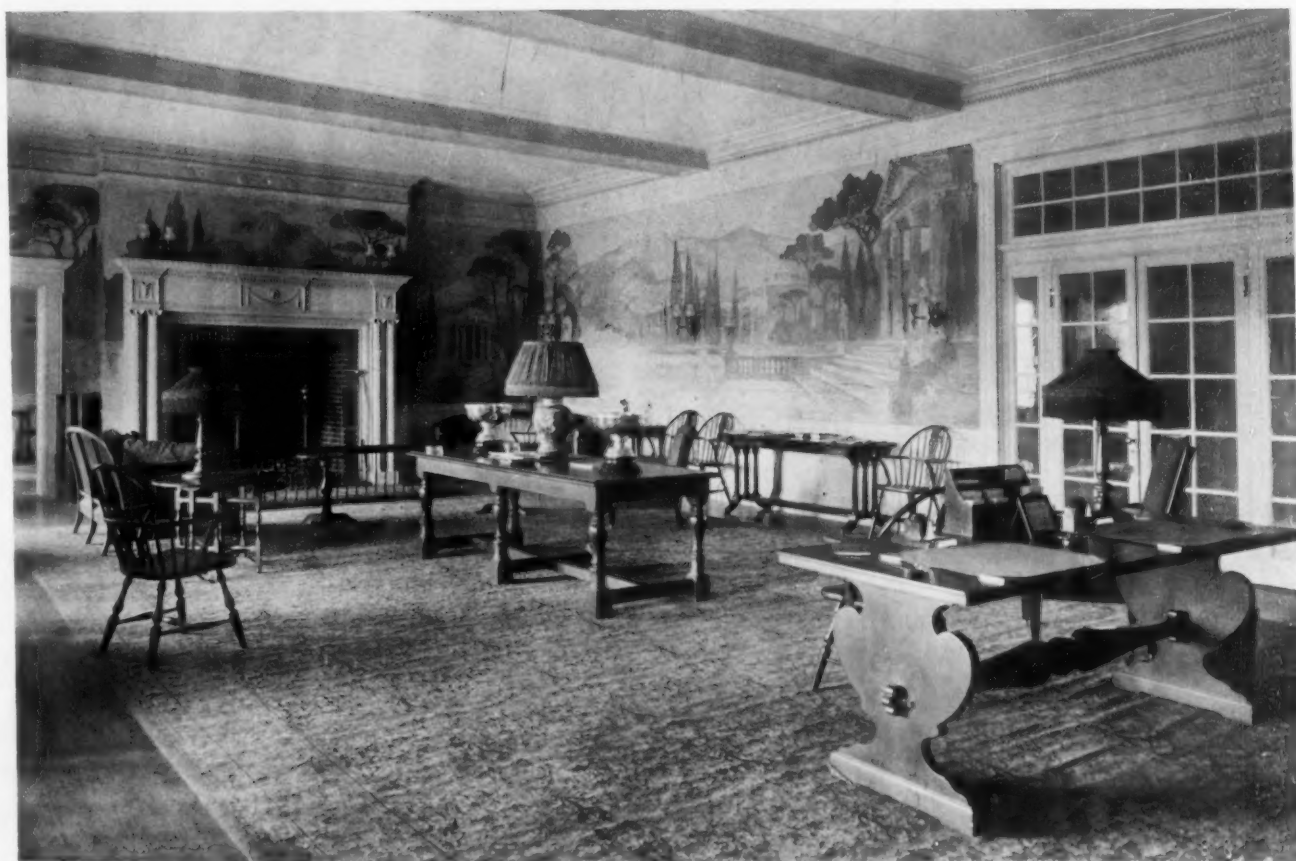
VIEW FROM THE LINKS

VIEW OF ENTRANCE FRONT AND LOCKER WING
ESSEX COUNTY CLUB, MANCHESTER-BY-THE-SEA, MASS.

PARKER, THOMAS & RICE, ARCHITECTS



VIEW OF DINING ROOM

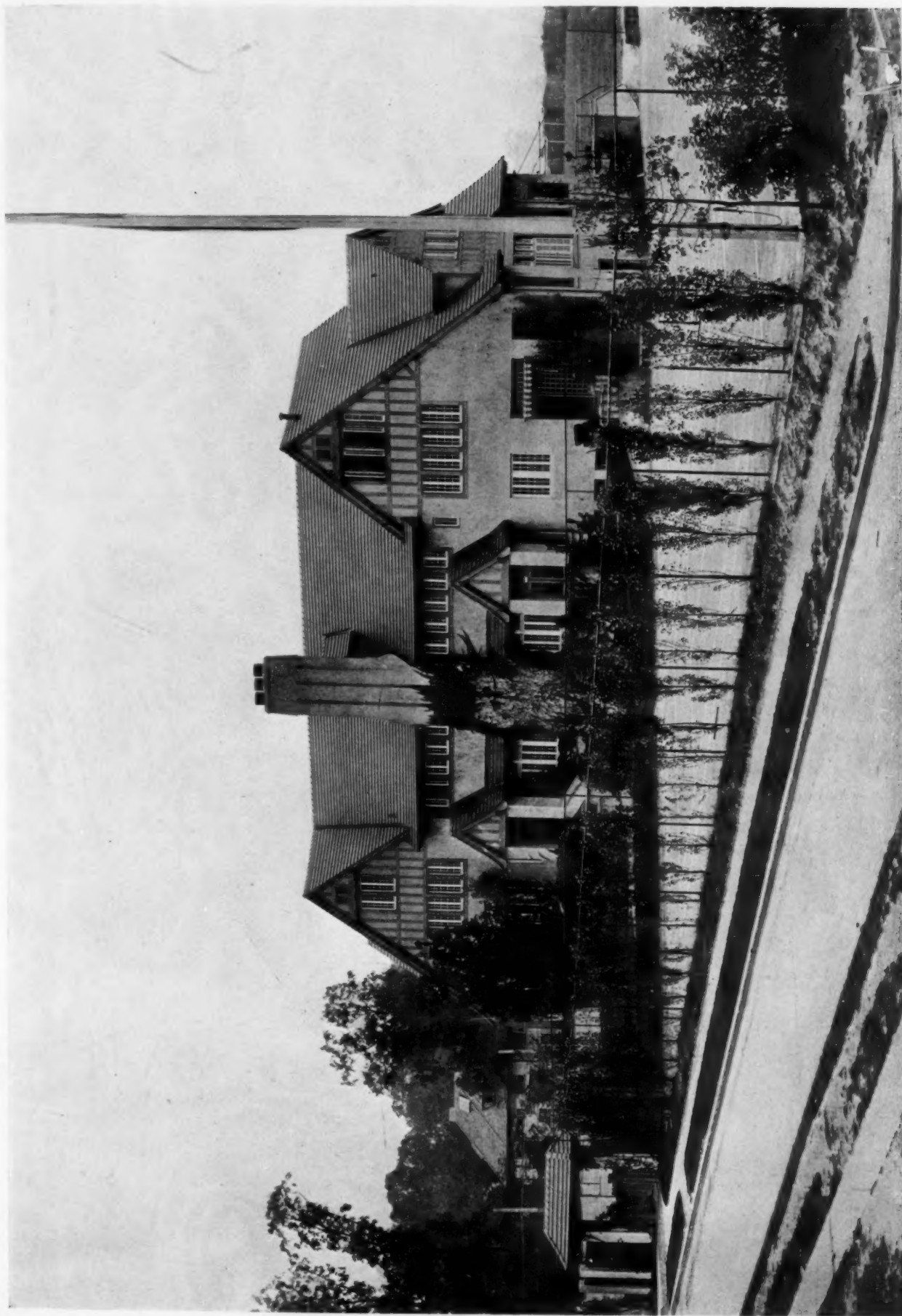


VIEW OF LOUNGE

ESSEX COUNTY CLUB, MANCHESTER-BY-THE-SEA, MASS.

PARKER, THOMAS & RICE, ARCHITECTS

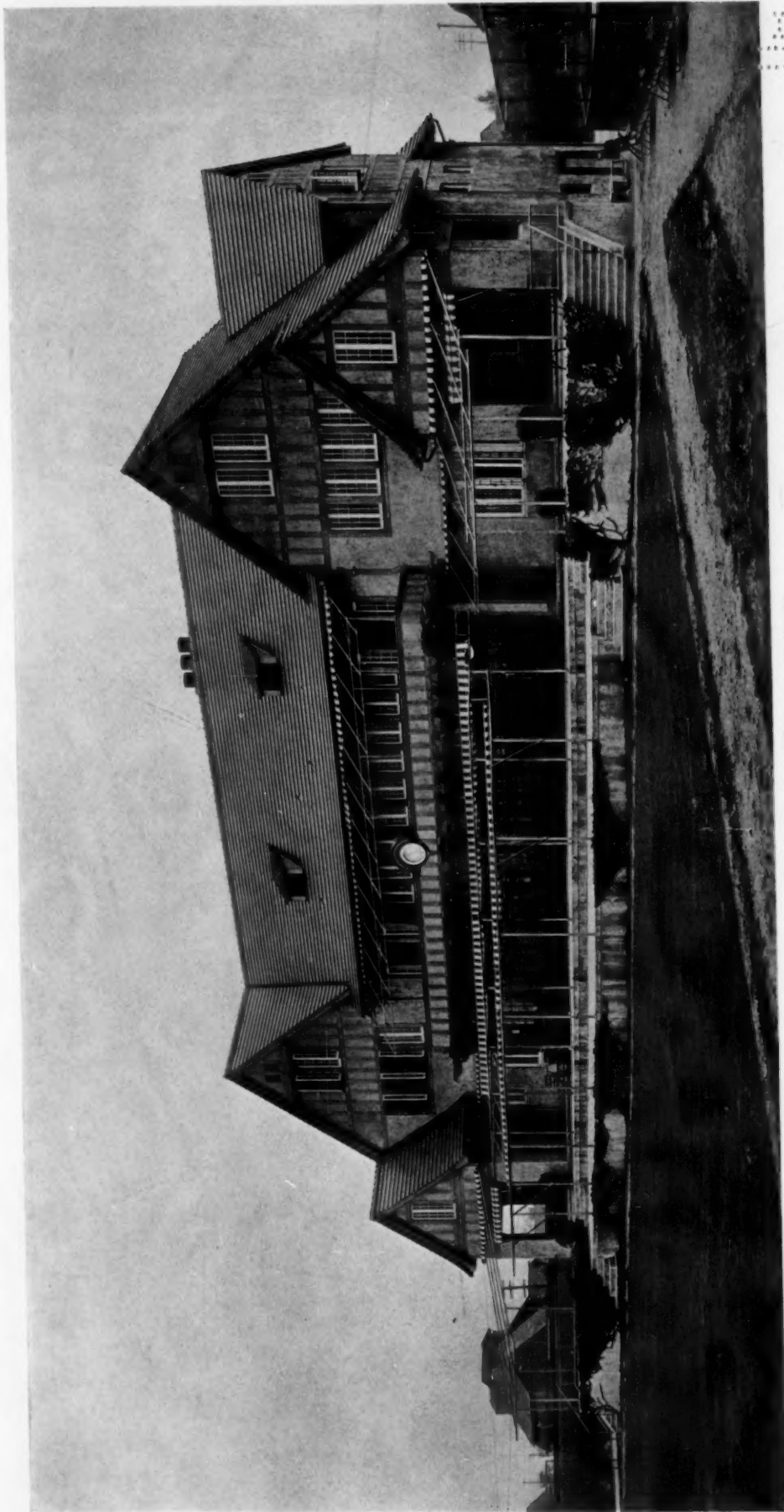
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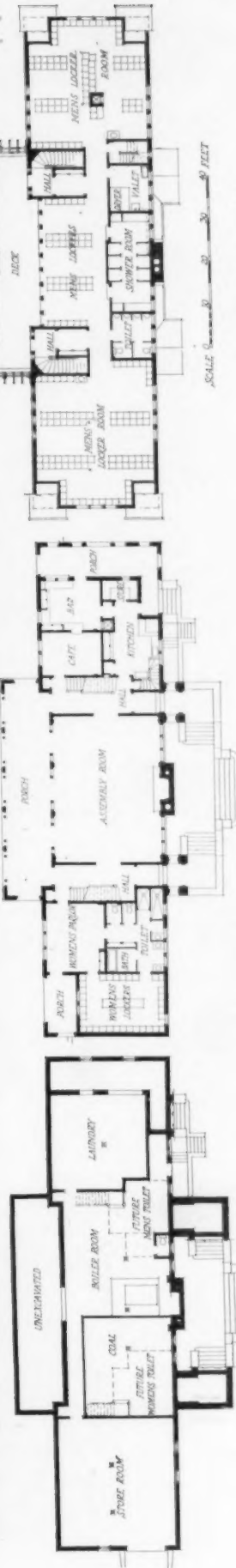
VIEW OF ENTRANCE FRONT

WEST SIDE TENNIS CLUB, FOREST HILLS, LONG ISLAND, N. Y.
GROSVENOR ATTERBURY AND JOHN A. TOMPKINS, ASSOCIATED ARCHITECTS

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VIEW OF FACADE TOWARD COURTS



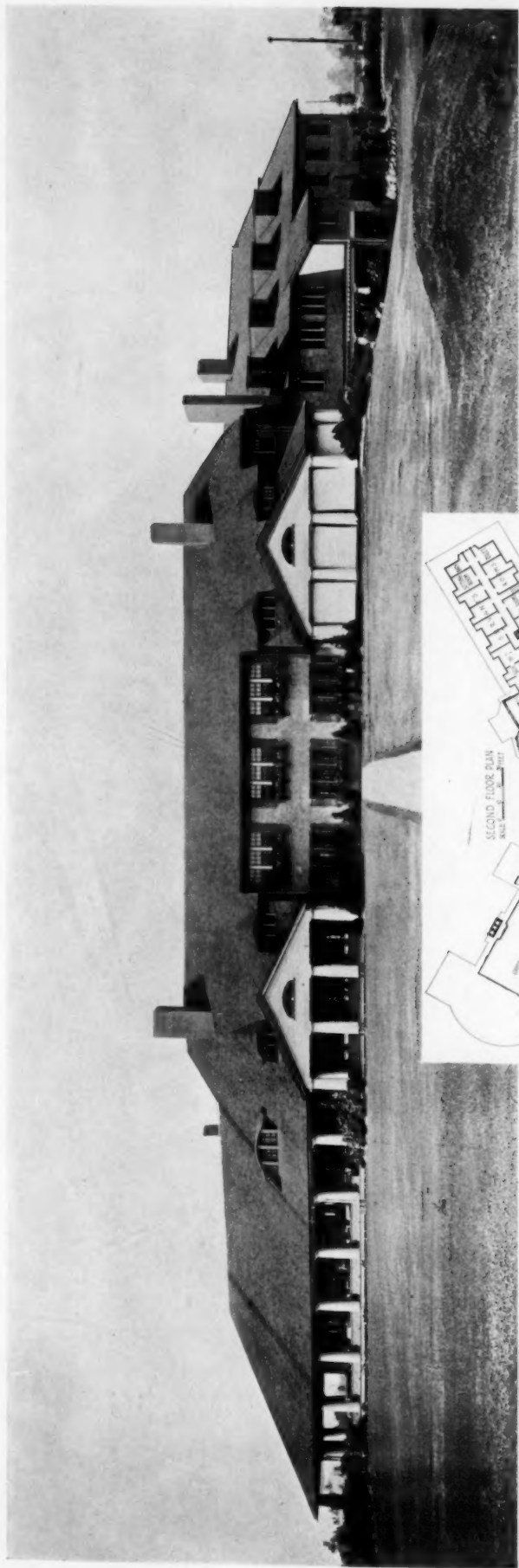
SECOND FLOOR PLAN

FIRST FLOOR PLAN

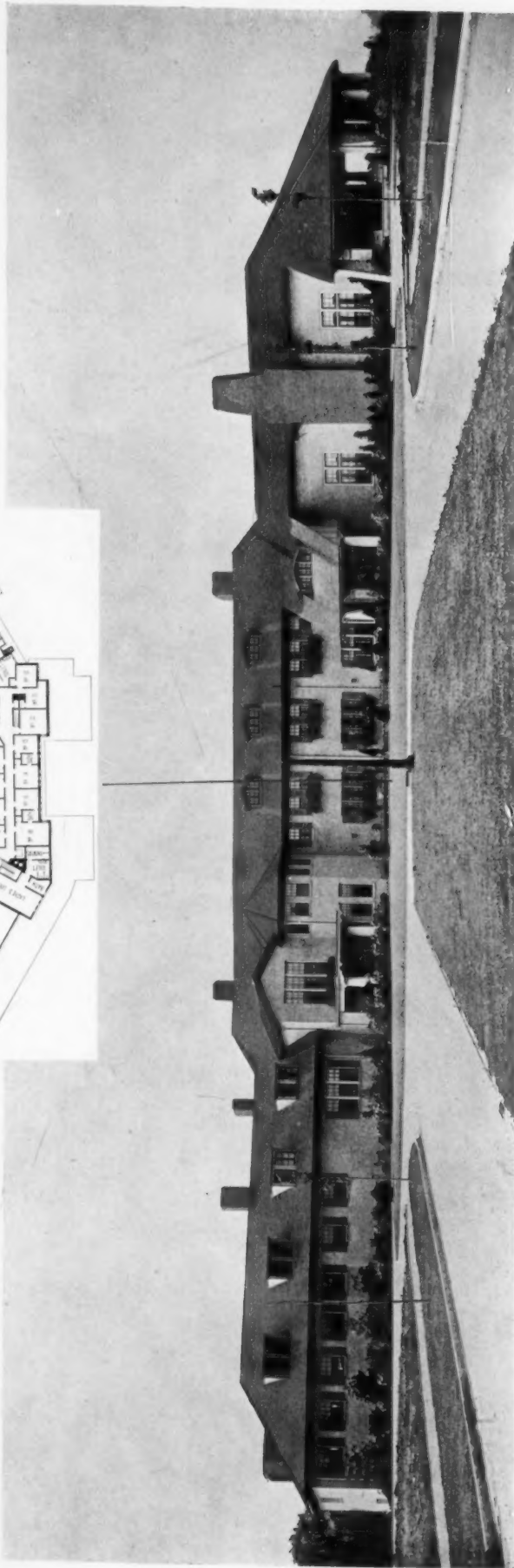
BASEMENT PLAN

WEST SIDE TENNIS CLUB, FOREST HILLS, LONG ISLAND, N. Y.
GROSVENOR ATTERBURY AND JOHN A. TOMPKINS, ASSOCIATED ARCHITECTS

THE
END
OF
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WORLD
IS
AT
HAND



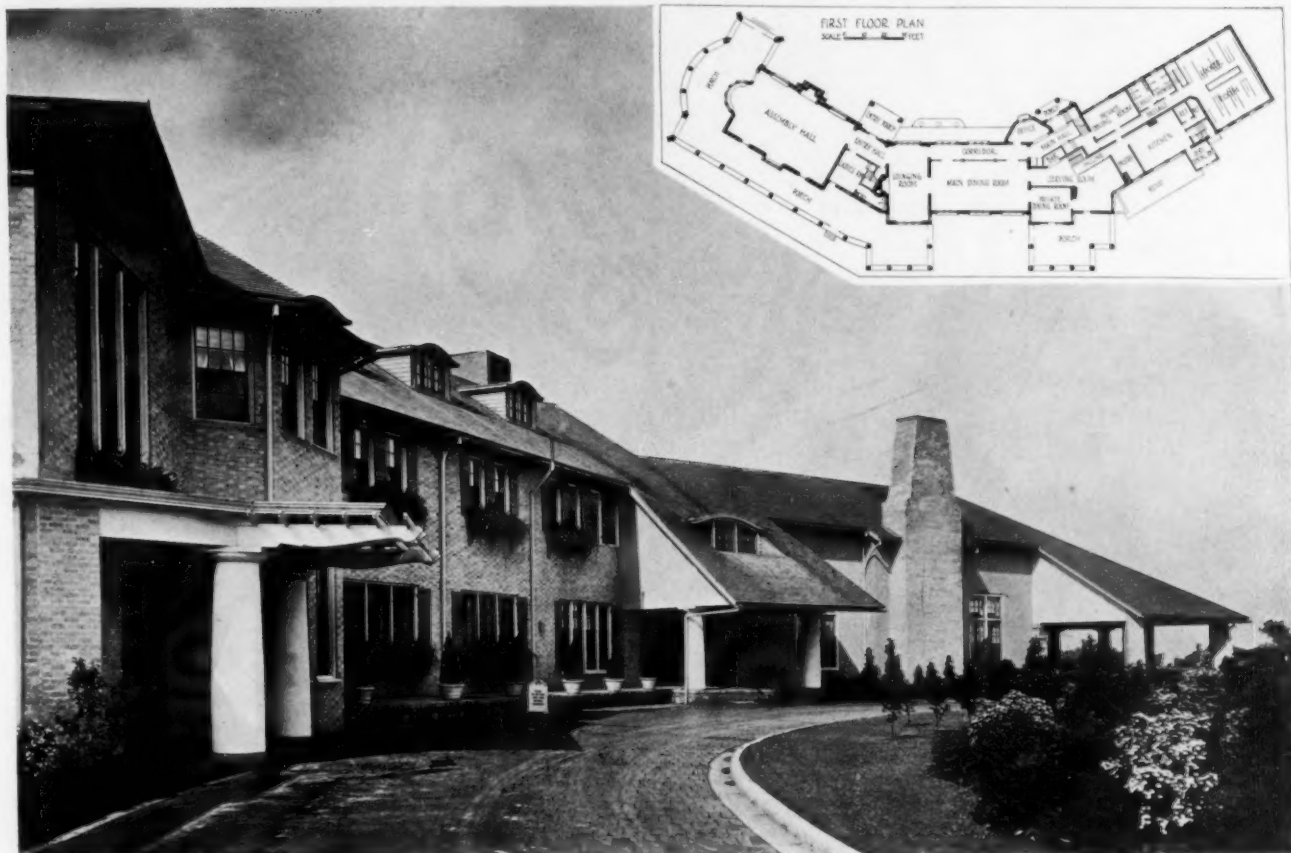
GENERAL VIEW OF ENTRANCE FRONT



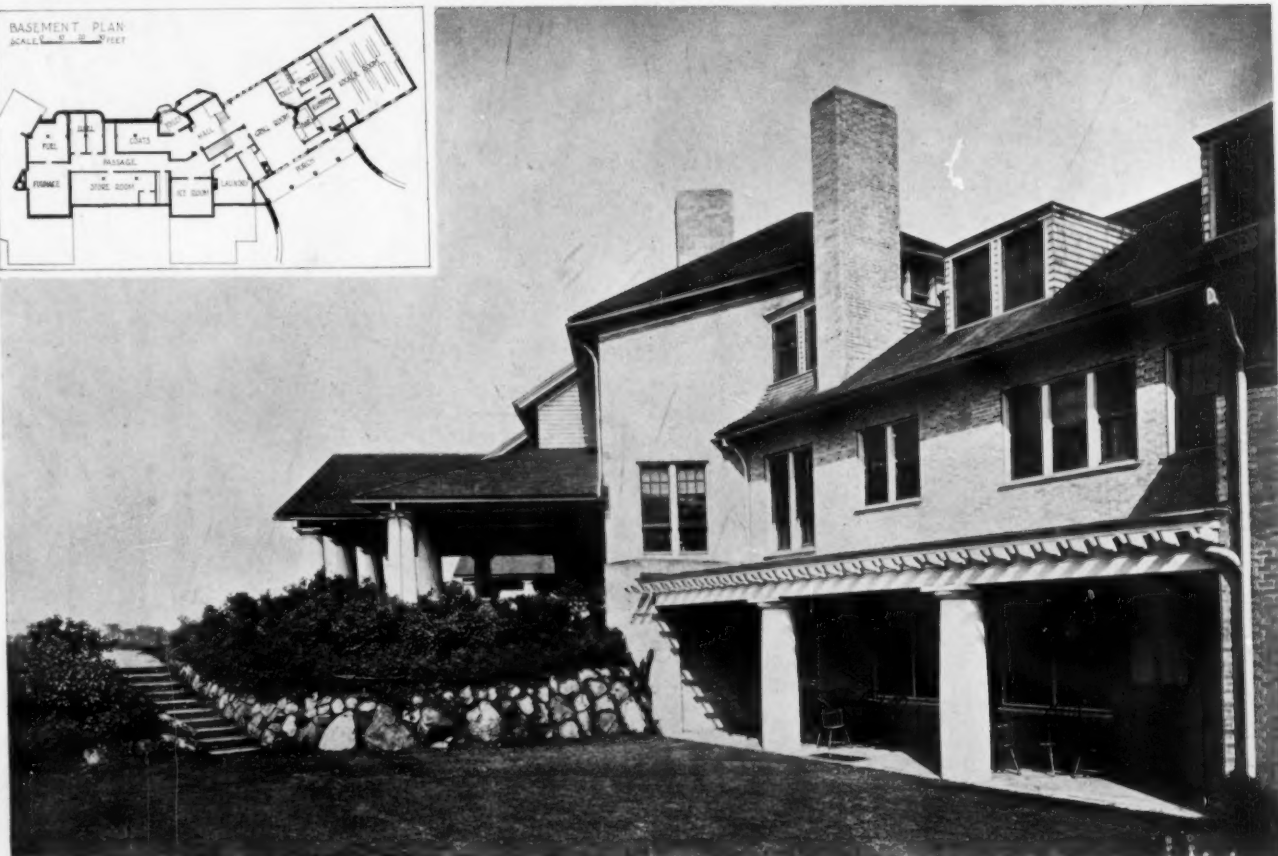
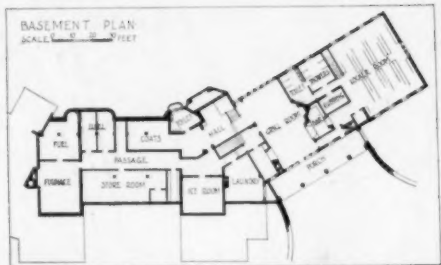
GENERAL VIEW FROM THE LINKS

SHAKER HEIGHTS COUNTRY CLUB, CLEVELAND, OHIO
FRANK B. MEADE & JAMES HAMILTON, ARCHITECTS

1840
1841
1842
1843
1844



DETAIL OF ENTRANCE SIDE



PORCH AT NINETEENTH HOLE
SHAKER HEIGHTS COUNTRY CLUB, CLEVELAND, OHIO
FRANK B. MEADE & JAMES HAMILTON, ARCHITECTS



VIEW OF LOUNGE



VIEW OF DINING ROOM

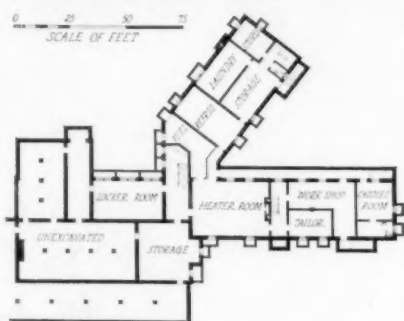
SHAKER HEIGHTS COUNTRY CLUB, CLEVELAND, OHIO

FRANK B. MEADE & JAMES HAMILTON, ARCHITECTS

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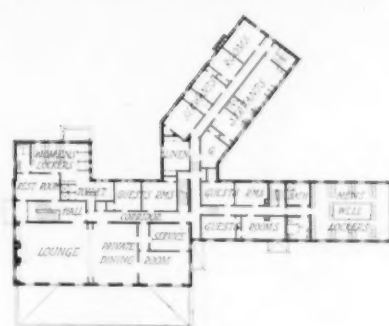
VIEW OF LOCKER WING END



BASEMENT PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

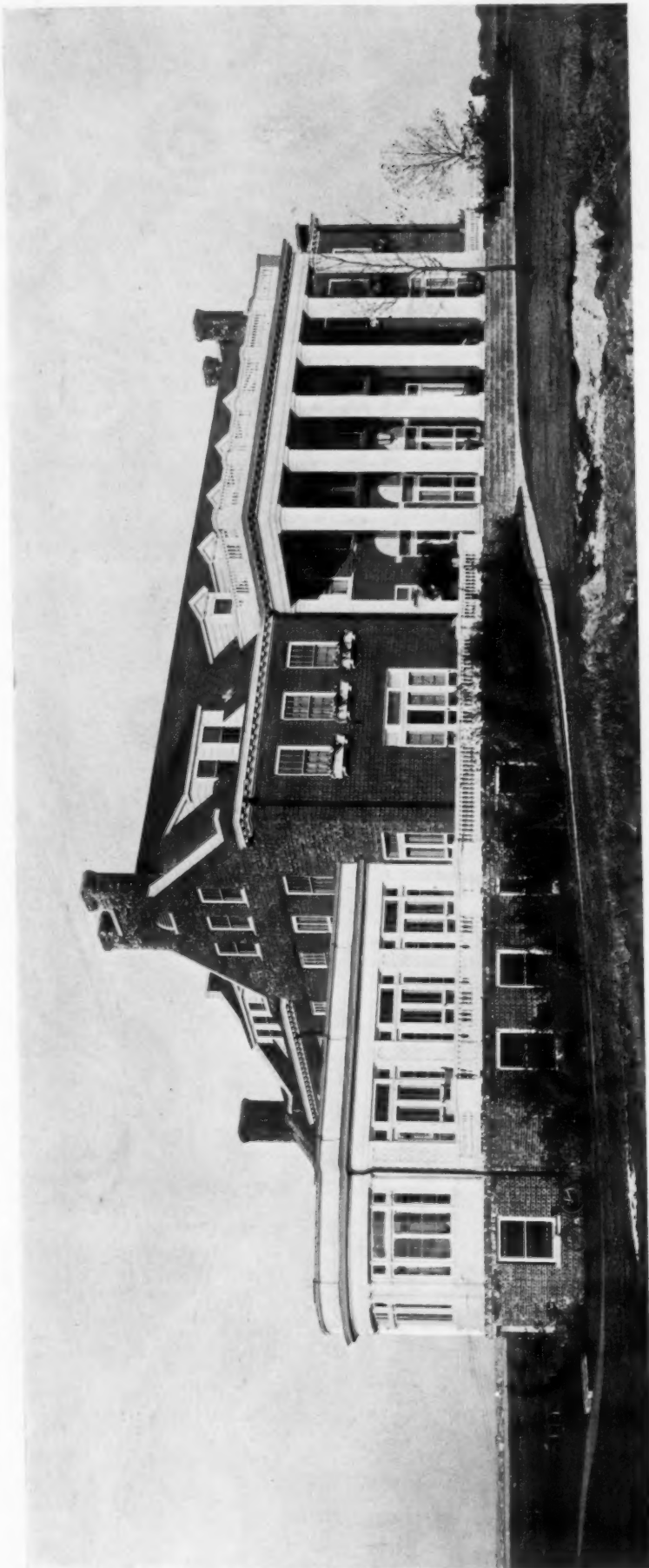


GENERAL VIEW FROM THE LAWN

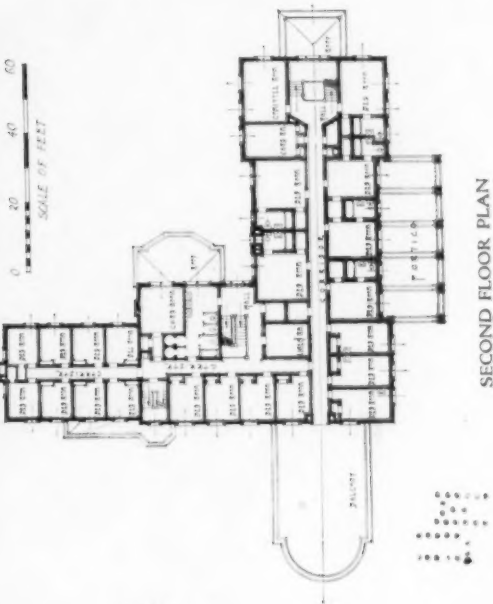
SCIOTO COUNTRY CLUB, COLUMBUS, OHIO

RICHARDS, McCARTY & BULFORD, ARCHITECTS

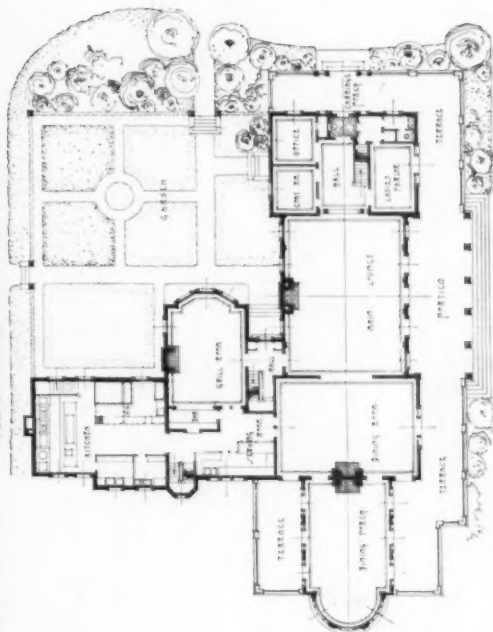
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VIEW FROM THE SOUTHWEST



SECOND FLOOR PLAN



FIRST FLOOR PLAN



BASEMENT PLAN

INWOOD COUNTRY CLUB, INWOOD, LONG ISLAND, N. Y.

MORRELL SMITH, ARCHITECT

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VIEW FROM APPROACH



VIEW FROM LINKS

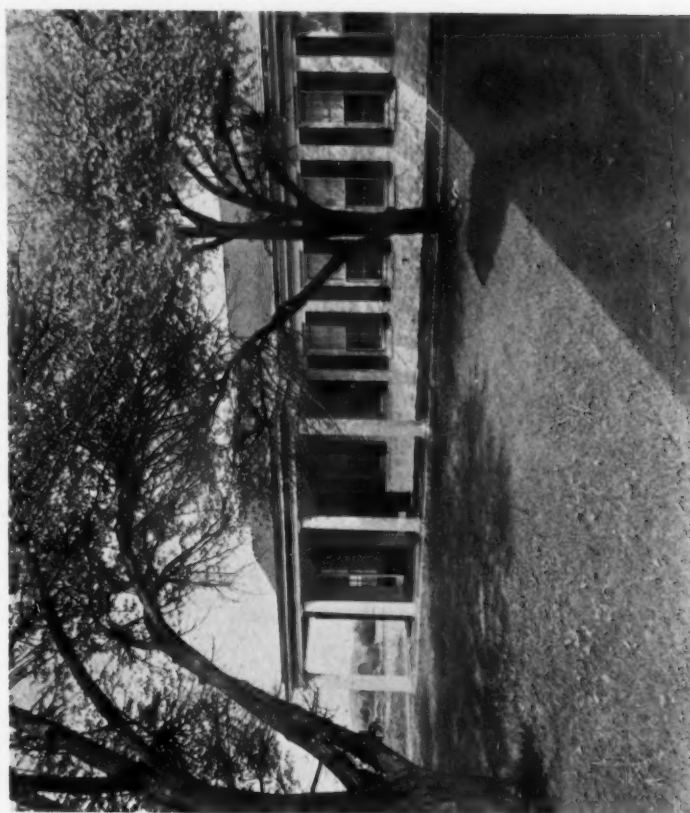
SOMERSET HILLS COUNTRY CLUB, BERNARDSVILLE, N. Y.

LORD & HEWLETT, ARCHITECTS

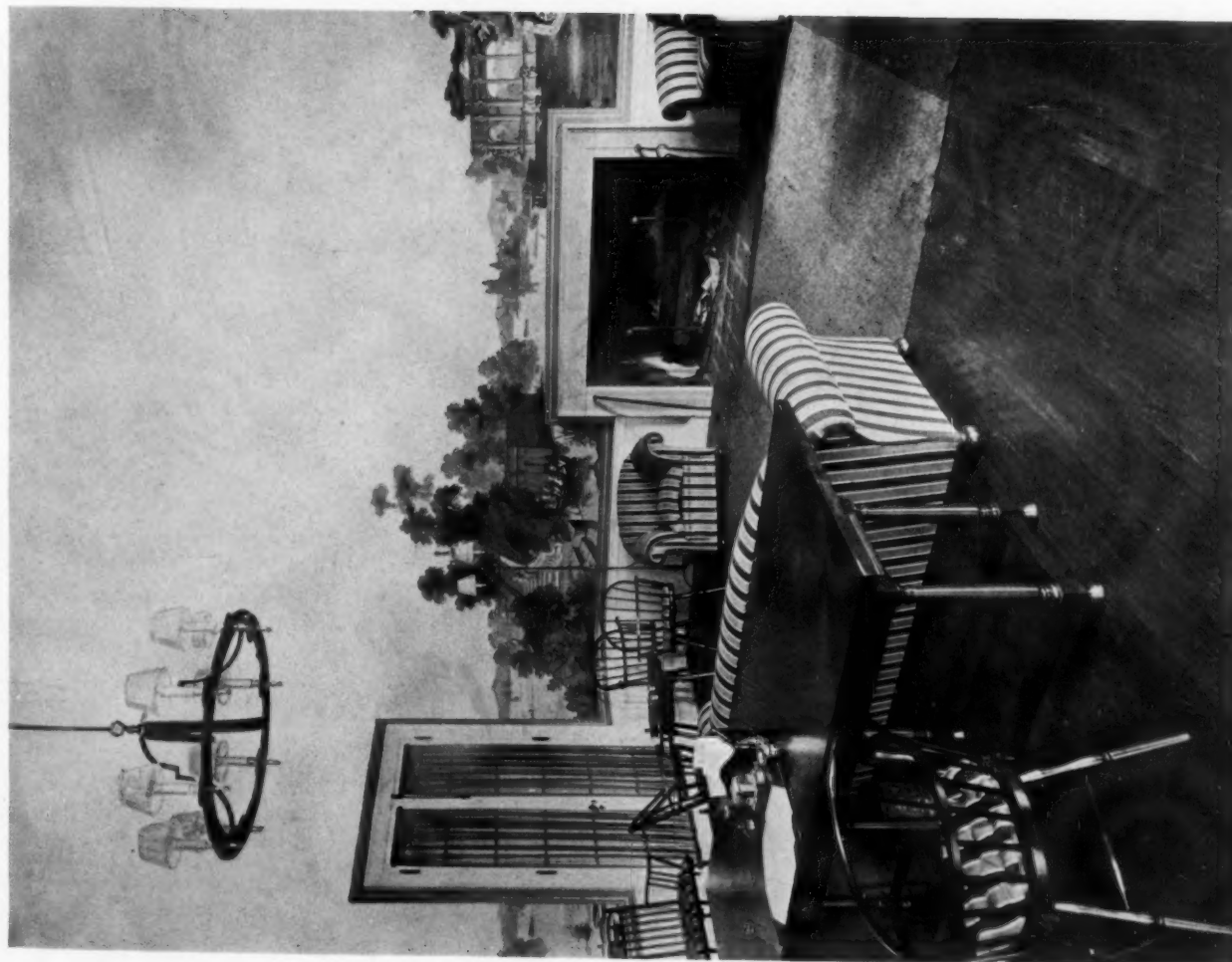
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VIEW FROM LINKS



DETAIL OF WING



VIEW IN LOUNGE

SOMERSET HILLS COUNTRY CLUB, BERNARDSVILLE, N. Y.

LORD & HEWLETT, ARCHITECTS

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Some Recent Country Club Houses

GOLF has come to be an important sport in American life, ranking second only to baseball in the number of its adherents. From humble beginnings it has grown to such an extent in recent years as to embrace 1,748 courses, according to the *American Annual Golf Guide*. It is estimated that \$85,000,000 are invested in club houses and courses, with an additional \$5,000,000 in clubs and balls, so it is easily apparent that the financial investment far surpasses that of any other American sport. It is the only game that is so universally appealing as to induce people to take time regularly from business or other activities to obtain outdoor recreation and exercise.

The planning of golf and country club houses has therefore become an important phase of architectural practice, and affords splendid opportunities for the creation of buildings of an informal and picturesque character. The work of the architect extends as well to the development of landscape features, for, in addition to an attractive house, it is desirable that playing over a course be made attractive from natural advantages or treatment of planting which will offer pleasant vistas from points of vantage.

The demands of members on a club house are many and varied, and because of them the development of the plan presents a particularly interesting problem. For that part of the club's facilities bearing on the athletic side the requirements are simple and comprise chiefly locker space for the members with adjoining toilets and shower baths and facilities for the management. Further requirements are accommodations for caddies, club repairing room, and professional's quarters, which are often incorporated in a separate small building in connection with the course. The social side of the club will require facilities in proportion to its membership and the intended use of the club by the members. The use of country clubs is rapidly being extended through the entire year, and an important factor in their planning is the provision of easy means of closing up portions of a club so that the part necessary to accommodate those following winter sports may be comfortably heated and operated in cold weather.

In the plates of this issue and the following pages

there are presented a selection of recent country clubs, embracing types devoted to all country sports as well as those restricted to a particular sport, such as golf or tennis, and the essential features of each of the buildings illustrated are mentioned in the following descriptive notes.

In attacking the problem of plan for the West Side Tennis Club at Forest Hills Gardens, the architects and Board of Governors were confronted with certain very definite limitations.

First: As the club drew a large part of its membership from New York City, it was desirable that the club house be placed within a two-minute walk of the railroad station.

Second: It was highly desirable that the building

be so placed on the property as to allow for the maximum number of tennis courts, sixty-four in all being provided. While the club house was designed to have a central building with two flanking wings, it was decided to construct the central portion only. This involved incorporating all essentials of a complete club house in this middle portion and at the same time so designing it that the future wings could

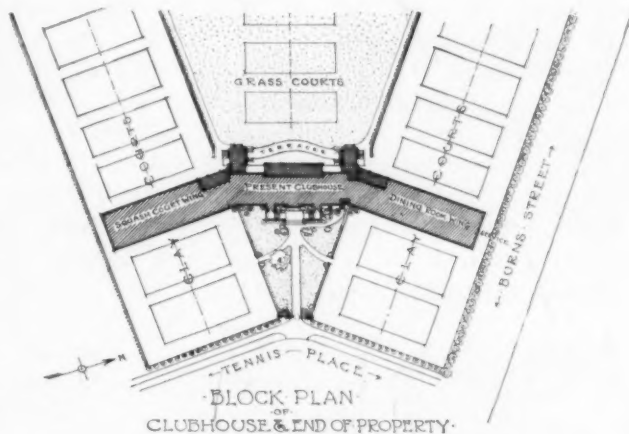
be added at any time without undue disturbance.

Third: In the matter of cost, there was on the one hand the necessity of providing ample accommodations for the existing membership; and on the other the high standard of construction set for all buildings in the restricted locality in which the club house was to be built.

These conditions were met first by the Board of Governors, who acquired a piece of land west of Continental avenue, which was fairly level, requiring but a comparatively small amount of grading for the courts. The fanlike shape of this property dictated the alignment of the courts on diverging lines with the club house at the apex.

Second: By the architects in sketching out a scheme for a tripartite treatment, the center unit of which was built, with provision for the future addition of the wings.

It is expected that, at some time in the future, these additional wings may be constructed to contain on one side squash courts and swimming pool and on the other the dining room. There also remains the possibility of adding two piazzas on the courts' side.



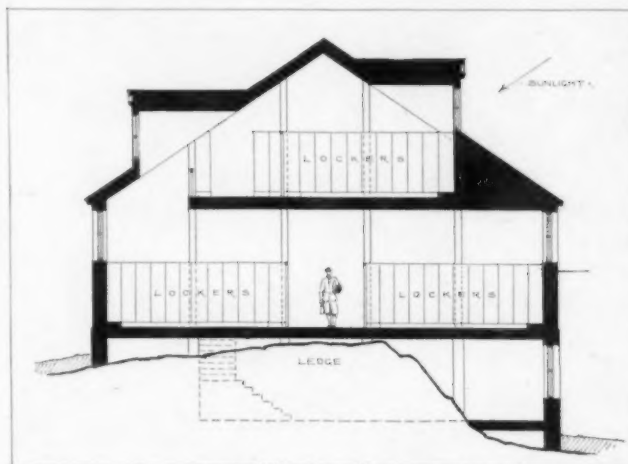
West Side Tennis Club, Forest Hills, L. I.

Grosvenor Atterbury and John A. Tompkins, Associated Architects

It will be seen by reference to the plan that the large assembly room occupies the central portion of the building, with its fireplace toward the entrance from the street, while the opposite side gives an unobstructed view of the courts. On either side is a hallway, to be used by all members. The south end of the building is devoted to the needs of the women members and the north side to the club service. The entire second story is given over to the men's locker room, etc.; while the double set of doors at the head of each staircase permits the women to have access to the open deck overlooking the courts.

Third: After a careful study of construction cost the following materials were chosen: for foundation walls, concrete cast in wood forms; for walls above, terra cotta blocks covered with stucco, with half timber planted on in the gables and dormer faces. Where the proposed wings would connect with the main building, frame construction is used above the second floor. The roof is covered with flat fire flashed interlocking tile in varying shades of red and brown. A small amount of steel was used where required for strength and to reduce settlement due to shrinkage. All other framing was done in spruce and hemlock. The exterior color scheme is a warm drab stucco, gray timbers, and white sash.

The interior finish consists of chestnut trim in the



Cross Section, Locker Building, the Country Club, Brookline, Mass.

principal rooms and halls, and cypress elsewhere with birch and cypress doors and birch floors. All finish was kept very simple in design and all woodwork was stained. In the interest of economy the second floor locker rooms were left with rafters exposed and stained. In the construction of the shower rooms marble was used for the partitions and the entire floor was of composition. A full and complete plumbing system was installed, and in the basement the necessary branch lines were run to provide for future additional fixtures. The heating system consists of a one-pipe, steam heating plant of modern type.

The Locker Building of the Country Club of Brookline, Mass., forms the end of a quadrangle of buildings and stands on a ledge which falls off steeply at the rear toward the south. The plan is distinguished by an arrangement of lockers which divides them in groups or sections. Besides this arrangement, which was stipulated from the beginning, effort was centered upon securing a maximum of natural light and ventilation, together with centralization of administration. Perhaps the most interesting feature of the building is its cross section, shown in the accompanying illustration. By cutting away the floor of the second story next the front wall, where it would be valueless for lack of head room, the air within the building is allowed to circulate freely in such a way that in whatever direction the wind may be, effective ventilation is maintained. The windows everywhere come above the level of the top of the lockers, so that all outer wall space is available, and the interior is flooded with light. A radiator stands in the center of each section of lockers, surrounded by a bench for use in dress-



Entrance to Locker Building, the Country Club, Brookline, Mass.
Andrews, Rantoul & Jones, Architects

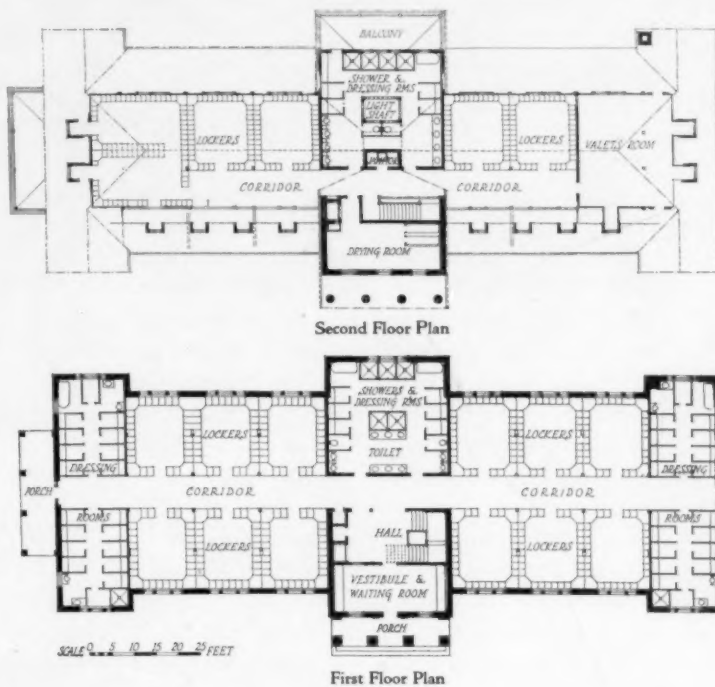
ing. At the two ends of the building private dressing rooms are supplied, with adjoining toilet accommodations. The main plumbing facilities are located in the center of the building opposite the entrance and a shaft is carried through to the roof, supplying additional light and ventilation. The floors are of maple.

The exterior has red brick walls, with white wooden trimmings and slate roof. The bricks employed are of the large unit type, forming a hollow wall, with light gray bricks on the inside carefully pointed. The building is of second class construction. A system of automatic sprinklers is installed throughout. It is 150 feet long and covers a total area of 7,478 square feet. Its cubical contents are approximately

180,000 cubic feet, and the cost was \$42,400, making the cost per cubic foot about 23½ cents. Construction was started in the fall of 1915.

The plumbing includes 4 sinks, 10 wash basins, 12 urinals, 5 waterclosets, 11 shower baths, and 5 bath tubs. The building is heated by steam radiators, with boiler plant in basement.

The plan of the Richmond Country Club eliminates hallways as much as possible, allowing the assembly room, general dining room, and billiard room to take the corridor service. This has the advantage of giving a more open plan, which is important in a southern climate. This plan also subordinates the bedroom feature, with the idea that this part of a country club is used only for a limited period, therefore



Locker Building, the Country Club, Brookline, Mass.
Andrews, Rantoul & Jones, Architects

making it unwise to devote highly desirable space to it.

Materials used in the building were in all cases local, except the enamel brick used in the swimming pool in the basement under the palm room. The balance of the brick used in exterior walls and terrace floors is a local brick, varying in shades from almost black to dark red, laid with raked joints.

The locker arrangements in the basement permit of convenient use of the pool on specific days during the week by the lady members. The cost of the club per cubic foot was the very low figure of 15 cents in 1910, which is largely attributed to the use of local materials and the open plan.

The Norfolk Country Club is characterized by the same openness in plan as the Richmond Club and uses two levels for the first floor, thereby hugging the ground. The roof construction in nearly all cases is exposed. The materials used are all local, the trim and exterior mill work being undressed material. One of the principal features in this club is the fireplaces, which are unusually large and very successful from an operating standpoint.

The locker room is two stories in height, all the framework being exposed, with three shower rooms consisting of two showers each. The porch floors and the café floor are ordinary common brick laid in sand with a sand joint. The cost of the building was 8 cents per cubic foot in 1911.

The Inwood Country Club was designed to provide accommodations for approximately three hundred members. The grill room will accommodate from fifty to sixty persons, the dining room from seventy-five to one hundred, and the dining porch about seventy-five. The kitchen is designed with facilities to serve approximately three hundred persons at one time.

The locker rooms, showers, and toilets for both men and women are located in the basement. The women's locker room provides lockers for about fifty members. Connecting with their locker room is a small lounging room. The floor and side walls of the toilet and wash rooms and shower rooms are tiled.

The men's locker room provides accommodation for approximately two hundred and fifty lockers, varying in size as follows: 15 by 18 inches, 18 by 18 inches, and 18 by 24 inches and 72 inches high. The locker room has a clear ceiling height of 10 feet and is well lighted. Eight shower baths with dressing rooms have been provided adjacent to the locker room. A wash room and toilet room of generous proportions, with a complete equipment, has also been provided close to and connecting with both the shower and locker room.

In the men's section the staircase, adjacent to the grill room, extends from the basement to the third story. It provides access from the men's lockers to the grill room and also with the bachelors' quarters

on the second and third stories. This staircase hall can be entered from the garden court on the basement floor level.

The building is a combination of frame and masonry construction. Where frame walls occur they are veneered with brick, to correspond with other walls. Exterior terrace floors are paved with brick laid in herringbone pattern, with borders of large, red quarry tiles. Interior trim used throughout, except in the grill room, is of white wood painted. All floors on the first story are of quartered oak, and on other stories of comb-grain yellow pine. The building is heated with steam. It was erected during the year 1915 and completed early in the year 1916. The cost was approximately 24 cents per cubic foot, including the heating plant, plumbing, electrical equipment, electric fixtures, vacuum cleaning plant, screens, weather strips, etc.

The Scioto Country Club is so situated that the main approach for motor cars and carriages is by a drive leading up to the west entrance. The main front of the building is toward the east, overlooking the golf links and the picturesque valley that extends through the grounds of the club from north to south.

In architectural treatment the building is Colonial, the exterior being rough red brick with wood trim, window frames, cornice, etc., painted white, the roof being of shingles stained green. The building is 170 feet long from north to south and, including the kitchen wing and porch, is 150 feet from east to west. The lounging room is 26 by 53 feet. To the north of the main lounging room is the dining room. This is separated from the lounge by a partition formed of accordion doors so arranged that they can be folded back into pockets at each side of the room, thus throwing the entire front portion of the building into one large room that can be used as a ball room or for other club entertainments.

The locker room in the wing extending to the north occupies a space two stories in height, and at the present time will accommodate over two hundred lockers. Provision is made for two shower-bath rooms, one on each floor, in connection with the locker room, each of these rooms containing three shower baths. The grill room in the same wing is 25 by 34 feet, with a large open fireplace at the north end. The room is so situated as to get light on both east and west sides, which will permit of its being opened up in summer and securing outside air and ventilation almost equal to a porch.

The kitchen occupies all that portion of the building extending northwest at an angle of 45 degrees, and is so located that all access to the dining porch, dining room, grill room, and second floor private dining rooms is from one end, thereby ensuring quick and economical service.

The porch located along the east side of the main



Grill Room, Bob-o-Link Golf Club, Highland Park, Ill.
Brown & Walcott, Architects



Grill Room, Shaker Heights Country Club, Cleveland, O.
Frank B. Meade & James Hamilton, Architects

building is 17 by 76 feet, and is so constructed as to permit of its being closed in with glass and heated when so desired.

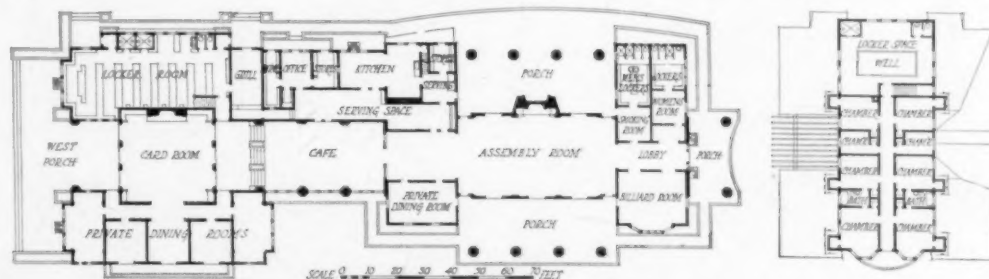
The Essex County Club at Manchester-by-the-Sea, Mass., is built in a permanent way, so that it may be used equally as much in winter as in summer. It is a free adaptation of English architecture with Georgian detail in the porches, and with an exceptionally rich texture in wall and roof surfaces. The exterior walls are of common red brick laid in running bond with every seventh course, all headers. The roofs are covered with slates graduated in exposure and thickness. Cornices, window trim, and porch details are of wood, painted white, and gutters are of the metal hanging type.

The building was planned to provide porches on these exposures so that all the prevailing breezes might be taken advantage of. The wing containing the dining room and extending out toward the golf

links is intended to screen the entrance to the men's locker building from those watching the play from the porch. The locker building is attached to the main building and, being situated on lower ground, it has been made two full stories in height without detracting from the importance of the main façade. From the second floor easy access is had to the café and the men's porch through the men's lounging room.

The ladies' locker and dressing rooms are on the second floor and are reached directly from the ladies' quarters on the first floor near the main entrance.

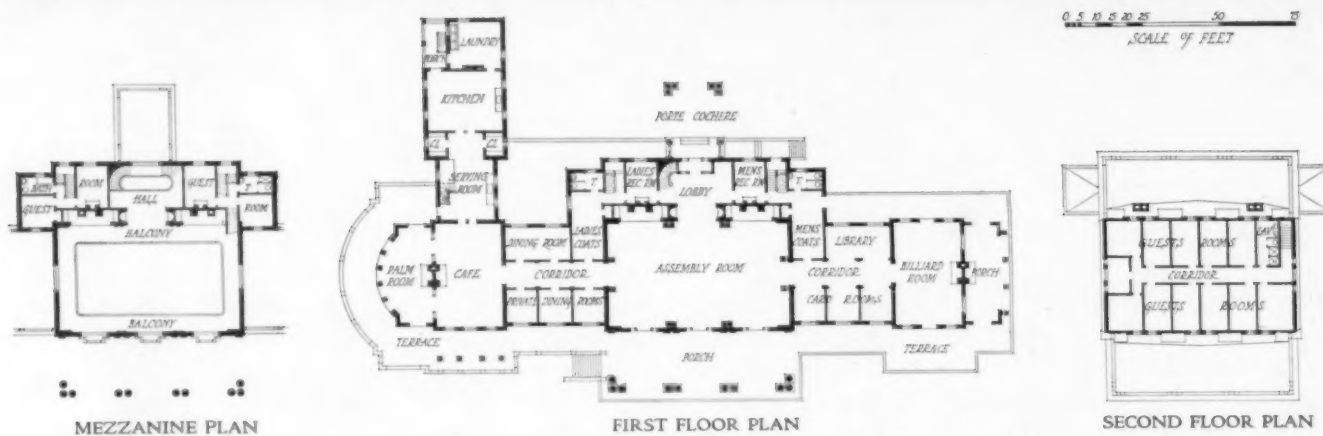
The Shaker Heights Country Club is admirably located, ten miles from the heart of Cleveland. The view obtained from the broad, double-avenued ap-



First and Second Floor Plans of Norfolk Country Club



General View of Norfolk Country Club, Norfolk, Va.
Neff & Thompson, Architects



COUNTRY CLUB OF VIRGINIA, RICHMOND, VA.
NEFF & THOMPSON, ARCHITECTS



Ladies' Room



Men's Room

Essex County Club, Manchester-by-the-Sea, Mass.

proach offers a charming picture of a long and low, light gray brick structure, with its rolling roof weathered to a brownish gray, and quaint dormers.

Entrance is made at either end of the central or main part of the building: the one at the east giving direct access, through a medium sized hall in which the office and telephone rooms are located, to the grill room in the basement, to the men's locker rooms and showers located in the eastern wing, and to the ground floor where the guest rooms are located; the other entrance gives access to the assembly room, ladies' rest room, and porch occupying the entire western wing, and to the lounging room at the left. A beamed corridor running the full length of the dining room, which occupies the main part, connects the two outlying wings.

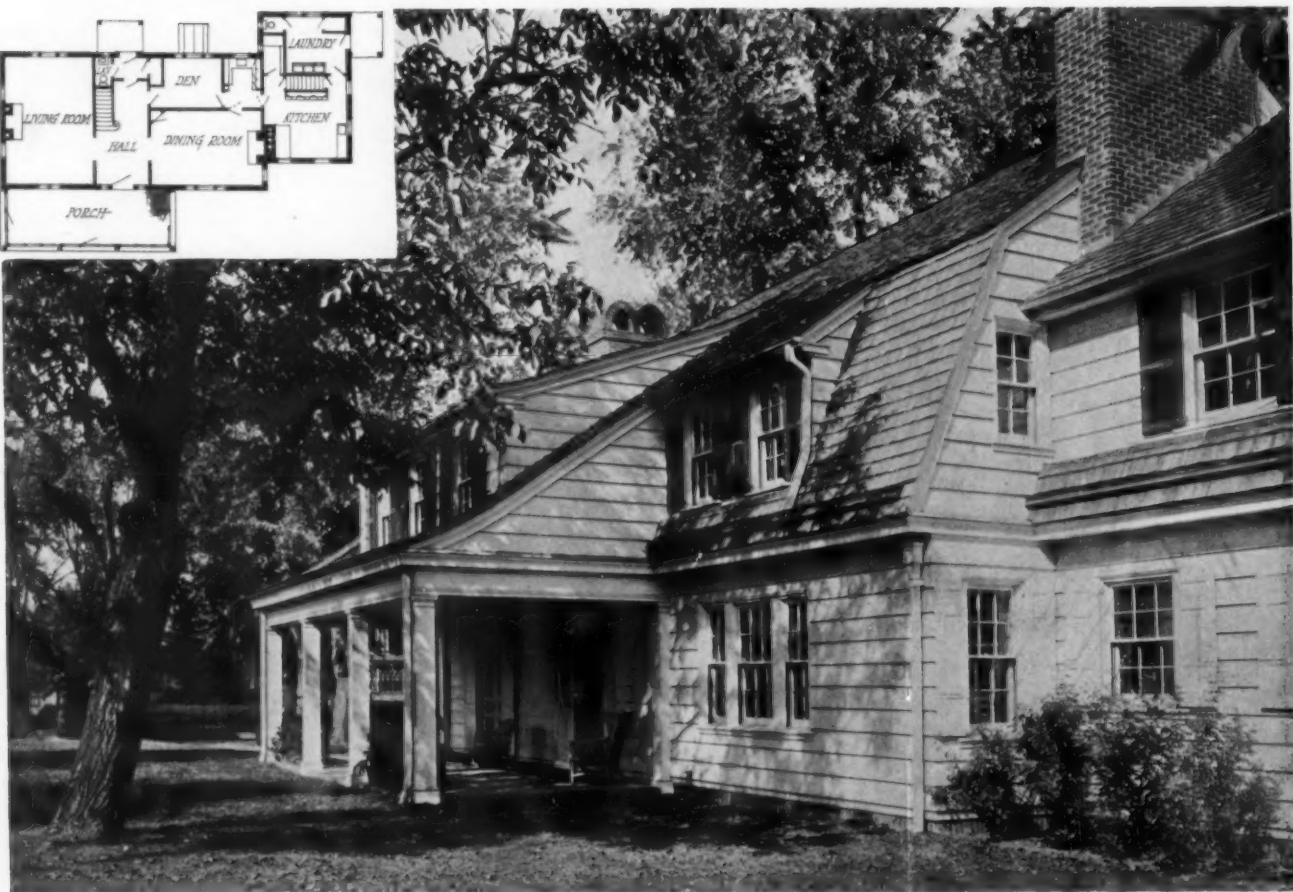
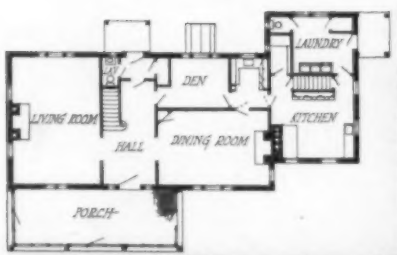
The grill room opens out on a terrace leading directly to the golf links. The ladies' locker rooms,

located in the opposite wing of the building, give direct access to the links and afford a desired privacy.

The interior, treated in a restrained English manner, by the employment of individual pieces of furniture, by a most unusual assortment of prints, and a discriminating choice in the selection of fabrics and rugs, reflects an atmosphere that is both pleasing and harmonious. The automatic sprinkler system used throughout has had the objectionable feature removed by making it a part of the decorative ornament in the plaster ceilings, which are Early English in character. The fireplaces in the lounging and assembly rooms have facings of artificial Caen stone. The grill room, finished in English oak, with Windsor chairs and tables, has Old English prints and silhouettes on the walls, conveying the effect of an old tap room. The walls are of rough gray plaster and the floor is cement marked off in large squares.



Shaker Heights Country Club from the Golf Course



HOUSE OF L. APPLETON, ESQ., HADDONFIELD, N. J.

SIMON & BASSETT, ARCHITECTS

Notes Concerning Federal Government Building

THE HOUSING DEPARTMENT OF THE SHIPPING BOARD is now located at 140 North Broad street, Philadelphia. It is known as the Department of Passenger Transportation and Housing. The personnel of this Department is:

A. Merritt Taylor, Director.
J. Rogers Flannery, Assistant Director.
Robert D. Kohn, architect, New York, Chief of Production.
Frank Goodwillie, architect (Wallis & Goodwillie), New York, Deputy Chief of Production.
D. Everett Waid, architect, New York, Deputy Chief of Production.
E. J. Russell, architect (Mauran, Russell & Crowell), St. Louis, Deputy Chief of Production.

Branch of Design: F. L. Ackerman, architect (Trowbridge & Ackerman), New York, Chief.

Project Supervisors: F. Mathesius, architect (Rich & Mathesius), New York; L. A. Goldstone, architect (Rouse & Goldstone), New York; E. S. Klein, architect (LaBeaume & Klein), St. Louis; W. T. Karcher, architect (Karcher & Smith), Philadelphia; A. Mackintosh, architect, New York; E. C. Wachendorff, architect, Atlanta, Ga.; J. W. Ritchie, architect, Philadelphia.

The following Housing Commissions have been assigned:

Bath, Me., Texas Shipbuilding Co. Appropriation \$540,000. Architect, R. Clipston Sturgis, Boston.

Portsmouth, N. H., Atlantic Corporation. Appropriation \$1,120,000. Architects, Kilham & Hopkins, Boston.

Bristol, Pa., Merchants Shipbuilding Co. Appropriation \$3,850,000. Architect, Carroll H. Pratt, Bristol.

Hog Island. Appropriation \$6,450,000. American International Shipbuilding Co. Consulting architect, Owen Brainard, New York. Architect for Dormitories, Geo. M. Bartlett, New York.

Camden, N. J., New York Shipbuilding Co. Appropriation \$3,686,400. Architect, E. D. Litchfield, New York.

Chester, Pa., Sun Shipbuilding Co. Appropriation \$1,800,000. Architect, Ernest Flagg, New York.

Chester, Pa., Chester Shipbuilding Co. Appropriation \$1,540,000. Architect, G. Edwin Brumbaugh. Simon & Bassett, consulting architects, Philadelphia, Pa.

Wilmington, Del., Pusey & Jones and Bethlehem Shipbuilding Co. Appropriation \$2,500,000. Architects, Ballinger & Perrot, Philadelphia.

Sparrow's Point. For Bethlehem Shipbuilding Co. Appropriation \$1,000,000. Architect, Edward L. Palmer, Jr., Baltimore.

Newport News, Va. Appropriation \$1,500,000. Newport News Shipbuilding Co. Architect, Francis Y. Joannes, New York.

Jacksonville, Fla., Merrill-Stevens Shipbuilding Co. Appropriation \$500,000. Architect, H. T. Klutho, Jacksonville, Fla.

Lorain, Ohio, American Shipbuilding Co. Appropriation \$770,000. Architect, Abram Garfield, Cleveland.

Port Jefferson, L. I., Bayles Shipyard, Inc. Appropriation \$240,000. Architect, Alfred C. Bossom, New York.

THE BUREAU OF INDUSTRIAL HOUSING AND TRANSPORTATION is now located at 615 G street, Washington. The personnel of this Bureau is:

Director, Otto M. Eidlitz, New York.

Asst. Director, Joseph D. Leland, 3d, architect (Loring & Leland), Boston.

Production, Burt L. Fenner, architect (McKim, Mead & White), New York.

Design, John W. Cross, architect (Cross & Cross), New York.

Estimating, N. Max Dunning, architect, Chicago.

Town Planning, F. L. Olmstead, Boston.

Engineering, J. W. Alvord, Chicago.

Construction, D. T. Webster, New York.

Investigation, I. N. Phelps Stokes, architect, New York; C. Grant LaFarge, architect, New York.

A number of housing projects have been assigned to architectural firms for development, although Congress has not as yet appropriated the \$60,000,000 asked for.

QUARTERMASTER'S DEPARTMENT, CANTONMENT DIVISION, 7th and B streets, Washington, Building C, Room 310-H, Lieut. Col. Francis B. Wheaton, Architect in Charge. This Department has charge of all Army Cantonment work. All buildings are designed by this Department and built under its direction. Libraries, theaters, Y. M. C. A.'s, and kindred buildings that are built at cantonments do not come under the supervision of this Department. A number of warehouses and buildings of similar type have been assigned to architects by other divisions of the Quartermaster's Department.

BUREAU OF YARDS AND DOCKS, 1317 F street, Washington, F. W. Southworth, Chief Draftsman. This Bureau has its own architectural department, and the probabilities are remote that work will be given to outside architectural firms, although the Hospital and Power House at the Brooklyn Navy Yard was given to a committee of New York architects headed by C. Grant LaFarge.

COMMITTEE ON EMERGENCY CONSTRUCTION, WAR INDUSTRIES BOARD, COUNCIL OF NATIONAL DEFENSE, Col. William A. Starrett, Chairman, architect (Starrett & Van Vleck), New York. Capt. Kenneth M. Murchison, architect, New York, and Capt. Alfred H. Granger, architect, Chicago, are on Col. Starrett's staff. This committee lets contracts for all buildings authorized by the War Department, but has nothing to do with the giving out of architectural commissions.

SURGEON GENERAL'S DEPARTMENT, HOSPITAL DIVISION, 7th and B streets, Washington. This Department is equipped to do all its own work. Most, if not all, of the buildings will be of temporary construction. Major John Allan Hornsby (Doctor) is in charge of this Division, assisted by Major Nathan C. Wyeth, architect, Washington, Major S. F. Voorhees, architect, New York, Capt. Howard Cutler, architect, Rochester, N. Y., Lieut. C. H. Woodbridge, architect, Chicago.

COMMISSION ON TRAINING CAMP ACTIVITIES, UNITED STATES WAR DEPARTMENT, offices 19th and G streets. This Commission is composed of nine members, with Raymond D. Fosdick, Chairman, and W. Prentice Sanger, architect, Secretary. Under its general direction are the military branches of the Y. M. C. A., Liberty Theaters, Camp Libraries, and many other sub-organizations, each with its own management, each providing its own funds, and each erecting its own buildings.

AVIATION DEPARTMENT, 7th and B streets, Building C, Room 3-317. Capt. Robert C. Dunbar, architect, New York, has charge of the personnel in the Construction Division. Nearly all of the work has been designed by Albert Kahn of Detroit. The construction of the buildings in France and elsewhere abroad, however, is done under the direction of men selected by Capt. Dunbar's Department.

RED CROSS WAR WORK, Red Cross Building, Washington. Charles E. Fox, architect (Marshall & Fox), Chicago, Chief of Construction Work. This organization does its own architectural work.

WAR TRADE BOARD. This Board reports that it has nothing to do with the assignment of architectural commissions. T. J. S. Fuller, architect, Washington, is connected with the Board.

Cass Gilbert is architect for the new supply base for the U. S. Army at Brooklyn.

Waddy B. Wood is architect for the new Washington Housing Development. Estimated cost, \$10,000,000.

J. H. de Sibour is architect for the additions to the naval group at Annapolis. Estimated cost \$6,000,000.

Ewing & Allen, New York, are architects for the housing development at the U. S. Nitrate Plant located at Muscle Shoals, Ala. This work is for the U. S. Ordnance Department.

Mead & Requa, San Diego, Cal., have been appointed associate architects with Albert Kahn of Detroit in building the permanent flying school at Rockwell Field, Los Angeles. This school will comprise a group of 60 or 70 permanent buildings.

Ewing & Allen, New York, are architects for the new Merchant Marine Training Station — Navy Department — at Pelham Bay, New York.

Mann & MacNeille, New York, are architects for the housing development for the U. S. Ordnance Plant at Sheffield, Ala.

George C. Nimmons is architect for the group of warehouses being built at Chicago for the Quartermaster's Department.

The following is the form of contract between Architect and the United States Shipping Board Emergency Fleet Corporation for the construction of houses :

THIS AGREEMENT made this _____ day of _____ in the year 1918, by and between _____ of _____, engaged in the profession of architecture, party of the first part, (hereinafter called "Architect" and referred to by the masculine pronoun "he" or its derivatives) and the UNITED STATES SHIPPING BOARD EMERGENCY FLEET CORPORATION, a corporation under the laws of the District of Columbia, party of the second part, (hereinafter called "Fleet Corporation") WITNESSETH :

Premises. The Fleet Corporation intends to erect a housing development at or near the city of _____, near the shipyards of the _____ on property _____.

Under the national emergency, the Fleet Corporation urgently requires the immediate performance of the services herein provided for as public services, and it is necessary that said services be completed within the shortest possible time; the Architect has the necessary facilities and organization for the performance of such services;

NOW, THEREFORE the parties agree as follows :

I

Scope and nature of services. The Architect shall, subject to the general supervision and direction of the Fleet Corporation, with all possible dispatch and giving precedence thereof to all other professional business which he may have, perform, in connection with the above-named construction work, professional services, which shall consist of the necessary conferences, the making of any necessary surveys of the site, the preparation of preliminary studies, working drawings, specifications, large scale and full size detail drawings, and also such drafting of forms of proposals and contracts, such checking upon issuance of certificates of payment and supervision of the said construction work as the Fleet Corporation may require.

The Fleet Corporation may, from time to time, give additional general or detailed instructions to the Architect, and may require professional services of a character similar to the above in addition to those theretofore ordered, or require the omission of services previously ordered; and the provisions of this agreement shall apply to all such additions, modifications and changes in the same manner, and with the same effect as if they were embodied herein. The Architect shall comply with all such instructions and requirements.

The title to any and all plans, drawings, specifications, details, original tracings and blueprints made by the Architect for use in the construction work; shall be in the Fleet Corporation upon their delivery to it, and the Fleet Corporation may use them for any purpose without compensation to the Architect except as hereinafter provided.

The Architect shall at all times use his best efforts in all his acts hereunder to protect and subserve the interests of the Fleet Corporation.

The Architect shall, in his own name, and upon his own responsibility employ, at rates not exceeding those ordinarily paid at this time to such persons for their services, all such assistants, subordinates, engineers, experts and consultants as may be necessary to the proper conduct of his work. In order that compensation paid to any of such persons, or any part of such compensation, shall be chargeable to the Fleet Corporation, the number of such assistants, subordinates, engineers, experts or consultants and the amount of their respective compensation must receive the authorization or approval of the Fleet Corporation, applied for and given in writing; and at all times during the period of the performance of this contract, such employment shall be subject to invalidation by the Fleet Corporation as a basis for reimbursement to the Architect.

The Architect has already been at work for a period preceding the date of this agreement; and he will now diligently proceed so that the construction work may be completed at the earliest practicable date; he shall use his best efforts to deliver as rapidly as possible to the Fleet Corporation as many copies of all plans, drawings, specifications, details, prints, and such original tracings as it may request.

The Architect agrees to pay promptly for all labor, material or services rendered to him.

II

Payments on account of expenses. Reimbursements. The Architect shall be reimbursed in the manner described in Article IV hereof, subject to the provisions of Article VIII hereof, for such of his actual net expenses necessarily, in the Fleet Corporation's opinion, incurred in the performance of his services hereunder and evidenced by receipts, vouchers or other evidence of the sort, from time to time re-

quired by the Fleet Corporation, as are included in the following items:

(a) The actual sums paid for any drafting necessary hereunder and verification of shop drawings, and writing of specifications, as shown by vouchers and signed time-cards, and such part of the compensation paid by the Architect to members of his office staff as may be properly, in the opinion of the Fleet Corporation, apportionable to the work hereunder.

(b) Sums paid engineers, experts and consultants, and other persons performing similar necessary services, whose employments by name and the rates of whose compensation are approved or ratified by the Fleet Corporation, and for such time as they were, in the opinion of the Fleet Corporation, necessarily employed on the work.

(c) Cost of reproducing drawings, printing or mimeographing specifications, and of models, telegrams, long distance telephone calls and expressage.

(d) Sums paid for transportation of the Architect or his assistants while traveling in discharge of duties necessarily in the Fleet Corporation's opinion connected with the work, and not in excess of Seven and a Half Dollars (\$7½) per diem for himself and for each regular office assistant for living and hotel expenses actually incurred while temporarily absent in discharge of his duties hereunder from the place in which his main office is located.

A sum equal to the sums paid to the Architect under sub-division (a) of this Article shall also be paid to the Architect as covering full and proper proportion of the general expenses of the Architect's office, commonly called overhead, representing items that cannot be apportioned in detail to this work.

III

Professional fee. The Fleet Corporation shall pay to the Architect, in the manner described in Article IV hereof, and subject to the provisions of Article VIII hereof, as the professional fee in full for his personal services under this agreement, the sum of _____ Dollars and no more; and with the desire to render a public service in the national emergency, the Architect shall accept said fee in full for his services hereunder.

IV

Payments. On or before the fifth day of each calendar month, while this contract may be in force, the Architect shall prepare and deliver to the Fleet Corporation a detailed statement of his expenditures up to and including the last day of the previous month for which he claims reimbursement or payment under the terms of Article II hereof, and the Architect at such time shall as far as practicable deliver to the Fleet Corporation original receipted bills and all other original papers not theretofore delivered, supporting expenditures on account of which the Architect claims reimbursement or payment.

If there be any items and/or amounts entering

into such statement which the Fleet Corporation does not approve, such statement shall be modified and changed to meet the approval of the Fleet Corporation and the decision of the Fleet Corporation as to such items and/or amounts shall be final, subject to the provisions of Article IX hereof.

On or before the fifteenth day of each month following the execution of this agreement, the Fleet Corporation shall pay to the Architect the amount due him, as shown by the statement approved by the Fleet Corporation.

The fee of _____ Dollars to the Architect shall be paid in such amounts and at such times as will, in the opinion of the Fleet Corporation, result in the Architect's being paid upon the basis of the schedule of percentages set forth in Article VIII hereof.

The Fleet Corporation may withhold from any payment provided for hereunder such an amount of money, if any, as may be necessary to cover any sums theretofore erroneously paid to the Architect.

Upon final completion of all the Architect's services hereunder, the Fleet Corporation shall pay to the Architect the unpaid balance of money, if any, due under the terms of Articles II and III hereof, subject, however, to the provisions of Article VIII hereof.

V

Inspection and audit. The proper auditing officials of the Fleet Corporation shall at all times be afforded proper facilities for inspection of the Architect's services and access to all of the Architect's books, records and other papers pertaining to said services; and the Architect shall preserve for a period of six years after the completion or cessation of services under this agreement all the books, records and other papers just mentioned. The system of accounting to be employed by the Architect shall be such as is satisfactory to the Fleet Corporation.

VI

Special undertakings of Fleet Corporation. The Fleet Corporation shall furnish the Architect with a complete and accurate statement of the boundaries of the building site and of the rights, restrictions, easements and all other legal limitations thereof. The Fleet Corporation shall pay for borings and test pits, and for chemical, mechanical or other tests when required. The Fleet Corporation shall provide and maintain, or cause to be provided and maintained, such suitable and properly equipped offices as may be required for the Architect's field representatives.

VII

No assignment by Architect. Neither this agreement nor any interest therein shall be assigned or transferred by the Architect. If there be a partnership, it is understood that, in the event of the death of a member of the Architect partnership, this contract shall enure fully to the survivor therein, and that, in the event of dissolution of said partnership, the succession to this contract shall be in accordance

with the desire of the Fleet Corporation. If the Architect be engaged in business for himself, it is understood that in the event of the death of the Architect, this contract shall, at the option of the Fleet Corporation, be rescinded.

VIII

Termination. The Fleet Corporation may terminate this agreement at any time by written notice to the Architect. In the event of such termination the Fleet Corporation shall pay to the Architect such amounts of money, if any, as may be then determined by the Fleet Corporation (a) as being due to the Architect on account of reimbursement for all sums expended or liabilities incurred by him prior to such termination, within the terms of Article II hereof, and (b) as resulting in the receipt by the Architect of the proper proportion, based upon the amount of work actually done by the Architect, of the total fee of _____ Dollars which the Architect is to receive for the total work hereunder. In determining the proportion of the total fee which has been earned by the Architect for services performed by him up to the time of such termination, the Fleet Corporation shall be guided by the following standard as to the value of the services of the Architect.

Upon completion and approval of preliminary studies, the Architect shall be entitled to a total of fifteen per cent of the professional fee.

Upon completion and approval of specifications and general working drawings (exclusive of details), the Architect shall be entitled to a total of fifty per cent of the professional fee.

Upon completion and approval of detail drawings, the Architect shall be entitled to a total of eighty per cent of the professional fee.

If such termination occurs at a stage other than those above mentioned, such fee shall be proportionately determined on the basis of the above schedule.

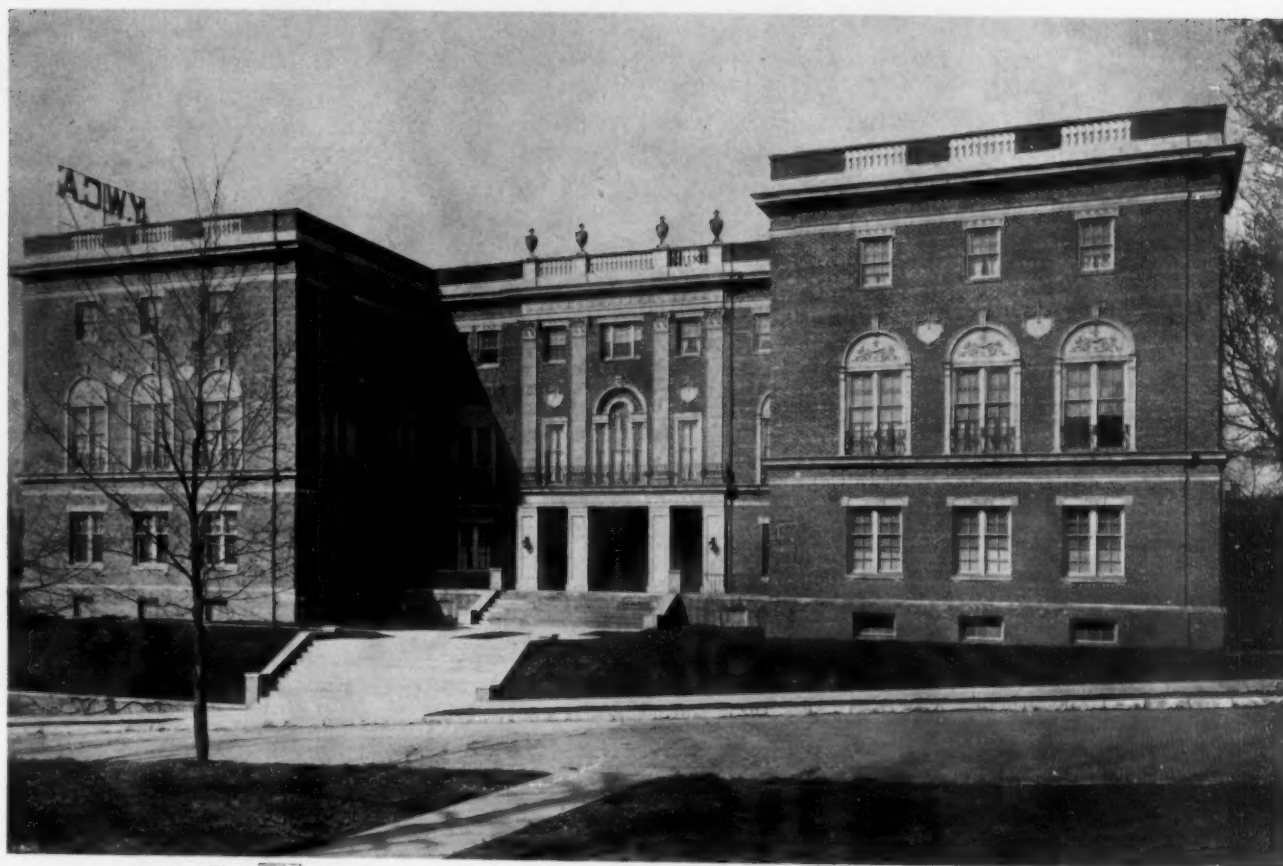
IX

Disputes. If any dispute shall arise between the Fleet Corporation and the Architect which cannot be satisfactorily adjusted, such dispute shall be promptly settled by three arbitrators, one to be chosen by the Fleet Corporation, one by the Architect, and the third by the first two. The decision in writing of any two of said arbitrators shall be binding on both parties, and the cost of such arbitration shall be borne equally between the Fleet Corporation and the Architect.

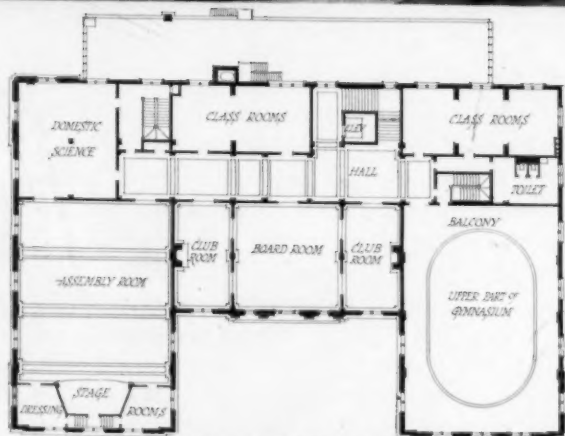
X

It is understood and agreed that whenever the words "Fleet Corporation" are used herein, they shall be construed to include its successor, any person to whom the duties of the Fleet Corporation may be properly vested, and any formal assignee or duly appointed representative of the Fleet Corporation.

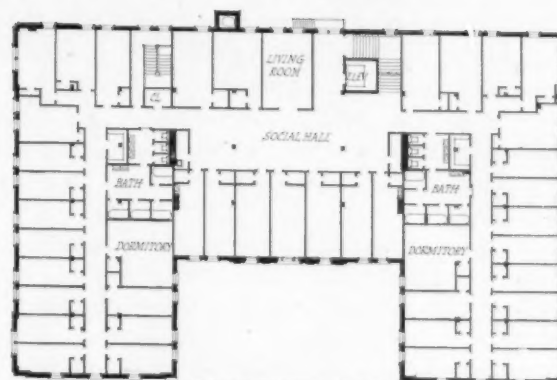
WITNESS the signatures of said parties to triplicate copies hereof the day and year first above written.



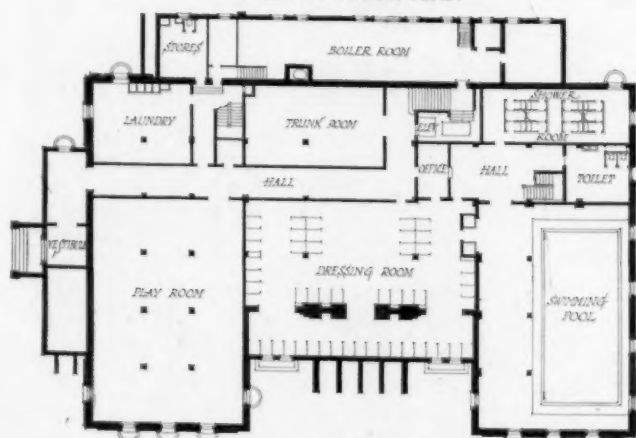
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SECOND FLOOR PLAN



THIRD FLOOR PLAN



BASEMENT FLOOR PLAN



FIRST FLOOR PLAN

YOUNG WOMEN'S CHRISTIAN ASSOCIATION BUILDING, ST. JOSEPH, MO.

WALTER BOSCHEN, ARCHITECT

EDITORIAL COMMENT

ONE of the marked features of our war preparation is the manner in which the building industry has served the Government in the erection of military and naval training camps, warehouses, manufacturing plants, and many different types of building required by our participation in the conflict. Were it not for the speed and efficiency which the industry was able to contribute to this work, our preparations for war would be far less advanced than they are to-day. Such a vast amount of construction probably never before occurred in an equal space of time, and it is undoubtedly true that similar attainments would be impossible in any other country.

Notwithstanding this large building program of the National Government, the full facilities of the building industry are not engaged. Owing to various reasons, chief among which has been a mistaken understanding that the Government opposes private building during the war, much work of a necessary character has been abandoned. As a consequence a serious situation is developing in the larger centers in that the buildings required to meet normal growth are not being supplied. War work has been placed for the most part in the hands of large building concerns which has tended to make them still larger, leaving the smaller units without means of employment. With private building reduced to the very lowest minimum, there has naturally been a decreased demand for many building products that find no place in war work. The industry as a whole is, therefore, contending with serious conditions which, if maintained for any further space of time, will eventuate in disorganization.

While it is the intention of every patriotic American industry to place the winning of the war above everything else, it is equally important that in so far as their activities do not conflict with the war, they should be maintained as factors in the earning power of the people. This is especially true of the building industry, and there are many instances of lessened activity resulting in loss to all connected with building, aside from the loss of the building's use, that are wholly unnecessary, and the curtailment of which has not aided the war program in the smallest way. Building materials of local character are easily obtainable in most markets and could be easily made so in all were there sufficient demand. All mechanics have not been absorbed by war work, and there are many conditions which make it difficult for them to change their mode of living and place of occupation in order to avail themselves of war work. These men should be regularly employed, and they can best be used in work with which they are familiar.

The building industry has undoubtedly suffered

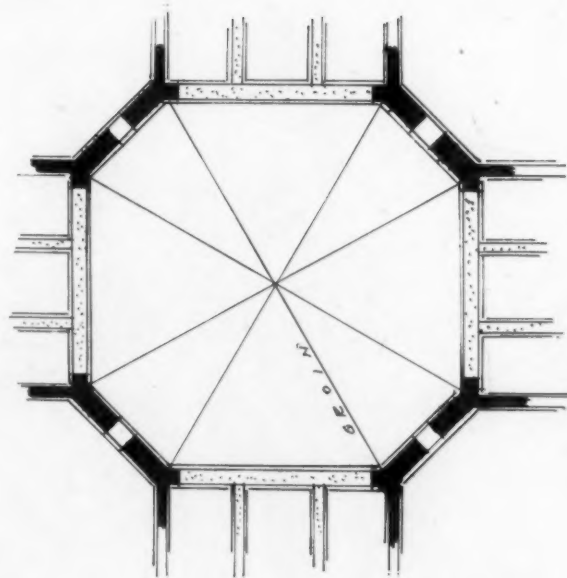
within the past year without any great necessity, and means should be adopted without further delay for restoring activities to as nearly a normal basis as is compatible with present conditions and without interfering with the conduct of war work. Steps have recently been taken toward this end, and the attitude of representative building interests in assembling to survey the present situation is to be commended: first, in that the results of careful organization will offer to the Government the complete resources of this most important element in the work it is called upon to do; and, second, in the service it will be to the industry itself in coordinating all forces to maintain its status and prevent any further unnecessary disorganization.

An informal meeting of forty representatives of organizations within the industry was held on June 14, at the Engineers' Club, New York, at which the sentiment was expressed that the various organizations of the industry were in the past obliged to act singly in matters pertaining to their interests and that the present time called for united effort, if the best results were to be accomplished. A resolution embracing this thought and empowering the chairman of the meeting to appoint a committee to study the plan of a national organization, was unanimously adopted. In such an organization it would be the aim to give fullest representation to all interested in building, including architects, engineers, material men, and contractors. It would operate in the sense of a clearing house through which an interchange of knowledge might be readily effected, and as an organ capable of speaking for the welfare of the entire industry. The organization committee appointed is composed of the following:

F. H. Chapin, vice-president, Hydraulic Press Brick Company; A. M. Maddock, president, Thomas Maddock's Sons Co.; W. D. Baldwin, Otis Elevator Company; W. H. Powell, Atlantic Terra Cotta Company; George F. Lindsay, White Pine Bureau; F. T. Miller, F. W. Dodge Company; B. F. Affleck, president, Portland Cement Association; Col. J. R. Wiggins, president, National Association of Builders' Exchanges; H. H. Murdock, chairman, Board of Directors, Building Industries of New York.

A period of reconstruction will follow the war that will demand the best efforts of all our activities. We will emerge from the conflict with renewed ideals of democracy and service to mankind that will form the keynote of our future endeavor. While the building industry has proved in its contribution to war activities its capability of splendid accomplishments in the way of speed and efficiency, it is destined to play a still more important part in the rehabilitation of the country in its peaceful pursuits, demanding a breadth of constructive vision for which it must now begin to prepare the foundation.

Example of Typical Guastavino Floor Vault



Ceiling Plan of Vault at Reduced Scale

ROUGH tile soffit, suitable for plaster finish with leveling over curvature forming spaces for ducts, etc. Soffit can also be furnished in glazed or acoustic tile as an integral part of the construction.

Without Structural Steel

R. GUASTAVINO COMPANY

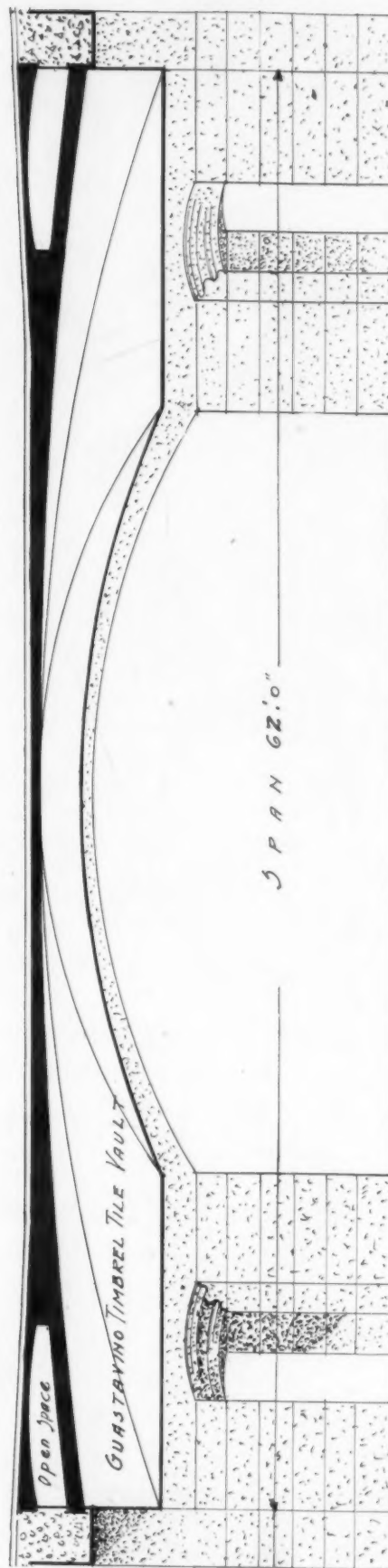
NEW YORK
949 Broadway

FACTORY
Woburn, Mass.

BOSTON
40 Court St.

Represented in California by Gladding McBean & Co.

San Francisco and Los Angeles



Cross Section through Floor Vault on Axis



TRANSFORMING a dead corner into a landmark; the story of Number 737 Sheridan Road, Chicago.

Architect H. H. Waterman was asked to create a design that would be remembered by all who journeyed along Sheridan Road.

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*Detail from the Buick Building, Philadelphia, Pa.
M. H. Dickinson, Architect*

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*Detail from Office Building at 10th and Chestnut Streets
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Both owners and architects are highly pleased with the appearance of the bright, cream glazed Terra Cotta furnished by us; it has given life and beauty to their building.

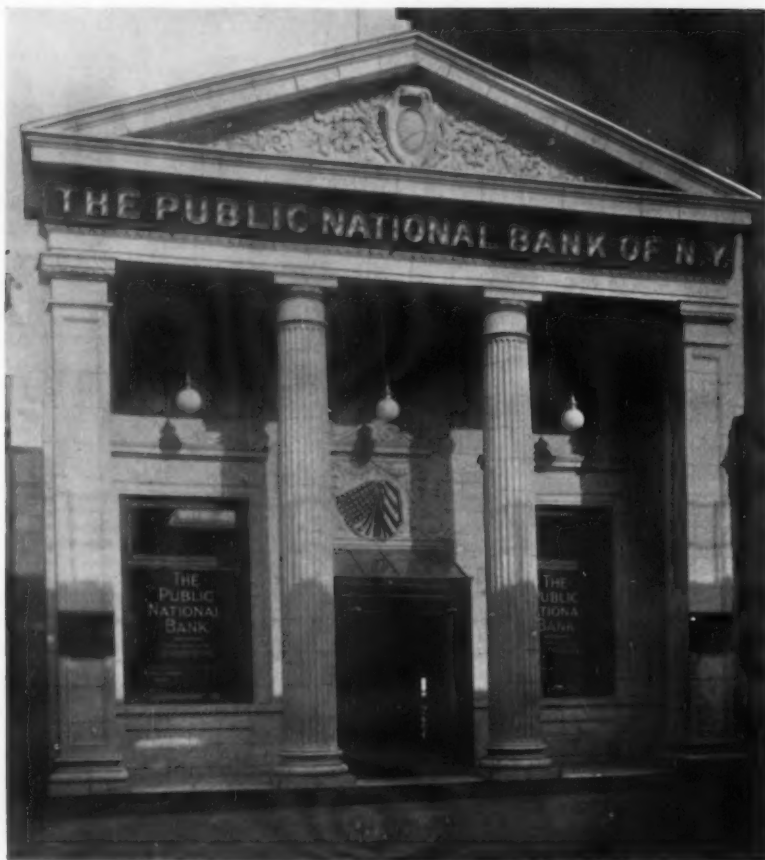
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G. W. SPITZER, ARCHITECT

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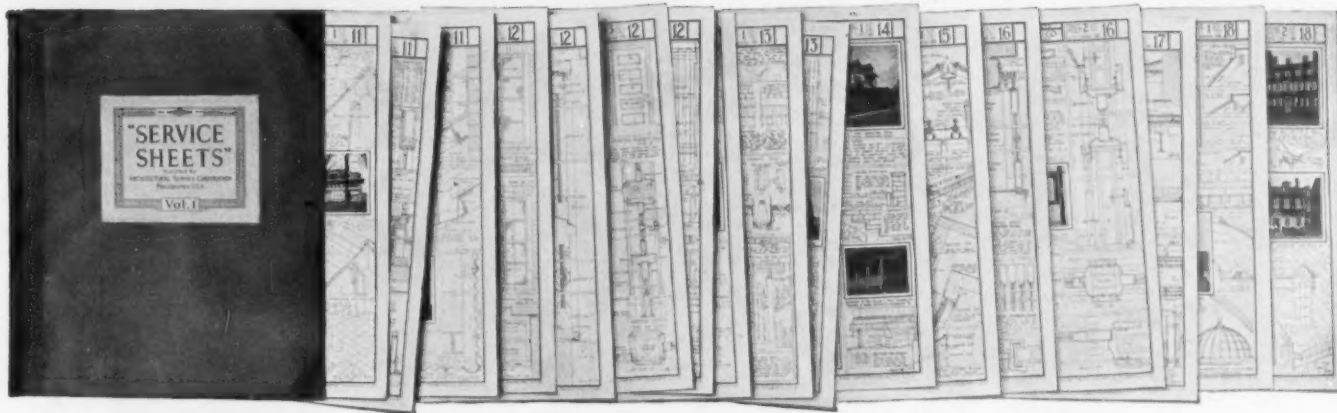
matte white enamel

TERRA COTTA

Rubush & Hunter, Architects



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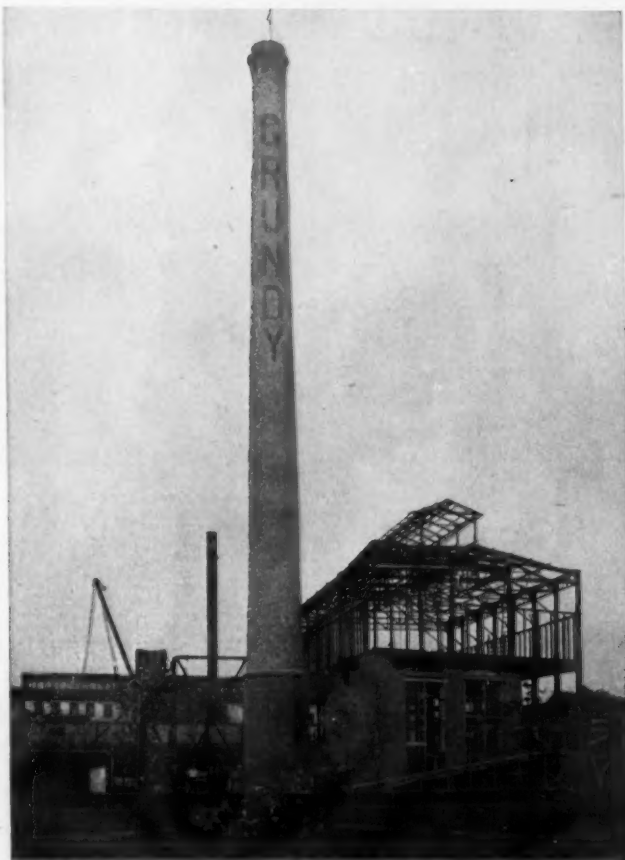
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The entrance hall of a home should be simple, practical, cheerful, hospitable and in perfect taste. The appearance of this hallway suggests these desirable qualities. The pleasing Jaspé linoleum floor is combined with plain plaster walls, a beautifully designed stairway, lighting fixtures and other decorative essentials of the simplest kind. — Frank Alvah Parsons, President of the School of Fine and Applied Art, New York City.

Are You Acquainted With Jaspé Linoleum?

IF not, you will find genuine delight in seeing the beautiful two-toned effect which this new pattern offers. The Jaspé Linoleum in this hall is gray, with a graining like moiré silk. The same design may also be had in green, tan, blue and brown.

This new creation makes a pleasing change from linoleums of plain colors, yet is fully as durable. The pattern extends through the material to its tough burlap back. Properly laid over unsaturated felt paper, it makes a highly sanitary base for fabric rugs that is comfortable underfoot and practically noiseless. And remember, it is less expensive both to install and maintain than hardwood, marble or tile.

A COPY of "The Art of Home Furnishing and Decoration," by Frank Alvah Parsons, with a portfolio of the de-luxe color plates of home interiors, can be secured for 20 cents in stamps. This publication furnishes many surprising examples of the artistic possibilities of linoleum floors.

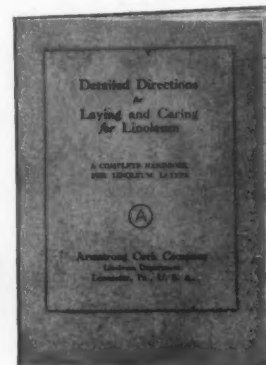
The various colorings of Jaspé Linoleums, in fact, reproductions of all the 380 patterns in which Armstrong's Linoleum may be had, are shown in the Armstrong Pattern Book, a copy of which, together with quality samples and a new handbook, "Detailed Directions for Laying and Caring for Linoleum," will be gladly sent to any architect or builder free upon request.

You are cordially invited to enlist the co-operation of our Bureau of Interior Decoration in solving your floor problems. Questions are welcome.

Armstrong's Linoleum

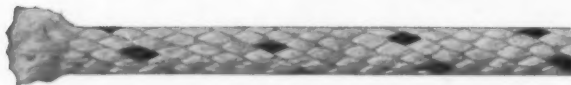
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R-3



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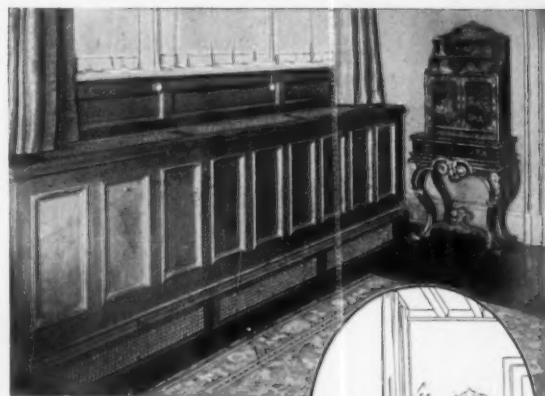
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Suggestions for Specifications

All pitched roofs shall be covered with (*Insert name of Pattern of tile wanted*) Tiles, made by Ludowici-Celadon Company, with stock fittings suitable for each pattern; all hip and valley tile to be cut to proper angle (valley tile for roll patterns to be filled) before burning. The tiles as specified above must be of shale, hard burned, of — color.

PREPARATION OF ROOF — Before roofer is sent for, the owner or general contractor shall construct roofs in strict accordance with plans, sheath roofs tight, have all chimneys and walls above roof line completed, have all vent pipes through roofs, furnish all strips of required width used under hip rolls and ridging, furnish all 1 x 7/8 inch cant strips used under tile at eaves (if required) and have all scaffolding ready for use of roofers. Metal contractor shall have all gutters in place on roof (gutters, whether box, hanging or secret, to extend over the roof sheathing and cant strip (if cant strip required) and extend under felt and tile at least eight (8") inches) and shall also have in place all valley metal, the width of which must be 24 inches (20 inches on short valleys where conditions are favorable), with both edges turned up 1/4 inch the entire length of valley. Valley metal must be laid over one layer of felt running lengthwise the entire distance of valley. Metal contractor must have in readiness all flashing metal used alongside and in front of dormers, gables, skylights, towers, perpendicular walls, also around vent pipes and chimneys, and place same after arrival of tile roofer and in accordance with requirements of the tiles.

LAYING OF FELT — After roofs have been thus prepared to receive felt and tile, tile roofer shall cover sheathing of the roofs with one thickness of asphalt roofing felt, weighing not less than 30 pounds to the square, laying same with a 2 1/2 inch lap and securing in place with capped nails. Felt shall be laid parallel with eaves and lapped over all valley metal about 4 inches, and laid under all flashing metal and turned up against all vertical walls 6 inches.

LAYING OF TILE — The roof having been thus prepared, tile roofer is to fasten tile with copper nails. Roofer shall see that tiles are well locked together and lie smoothly, and no attempt shall be made to stretch the courses. Tile must be laid so that the vertical lines are parallel with each other and at right angles to eaves.

The tiles that verge along hips shall be fitted close against the hip board, and a water-tight joint made by cementing cut hip tile to hip board with good elastic cement. Each piece of hip roll shall then be nailed to hip board, and hip rolls cemented where they lap each other. The interior spaces of hip and ridge rolls must not be filled with pointing material.

LUDOWICI-CELADON COMPANY

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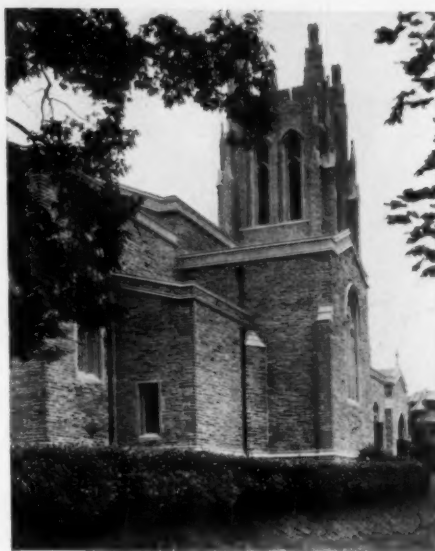


THE EDITORS FORUM



WE present in this issue complete data on the planning of buildings designed to obtain the full benefit of sunlight in their lighting. The importance of this subject is appreciated by every architect, yet entirely satisfactory results are often difficult to guarantee at the stage of preparation of plans because of limited information on the subject and the complicated and arduous mathematical computations necessary for determining the areas of light and shadow at different times of the day and year. Mr. Swan and Mr. Tuttle have given in their paper, "Sunlight Engineering in City Planning and Housing," the results of long and intensive study to the subject, and with the accompanying detailed tables, covering any orientation and any height of building, the principles for determining sunlight areas may be easily applied to any plan. The value of sunlight from sanitary and health standpoints is universally recognized, and it is particularly of great importance in northern latitudes, where sunshine is not provided lavishly, that buildings be so oriented and planned as to take advantage of all available.

THE industrial housing project near Camden, N. J., illustrated from drawings in this issue, is one of the first commissions to be given architects under the recent appropriation of the National Government for relieving the housing shortage around shipbuilding and munition plants. It is particularly gratifying to note that the work of designing these Government towns will be placed in the hands of capable architects, for aside from the present emergency, demanding a correct and speedy solution of the problem, its ultimate influence on future real estate and speculative work will be far reaching in effect, and it is of utmost importance that it be for good.

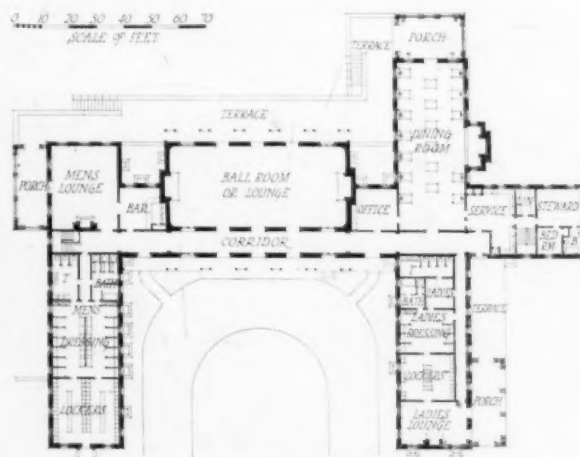


Church of the Epiphany, West Philadelphia
Showing Relation of Tower to Main
Structure

*Upper Portion of Tower is Shown in Detail in
Gothic Detail Plate of This Issue*

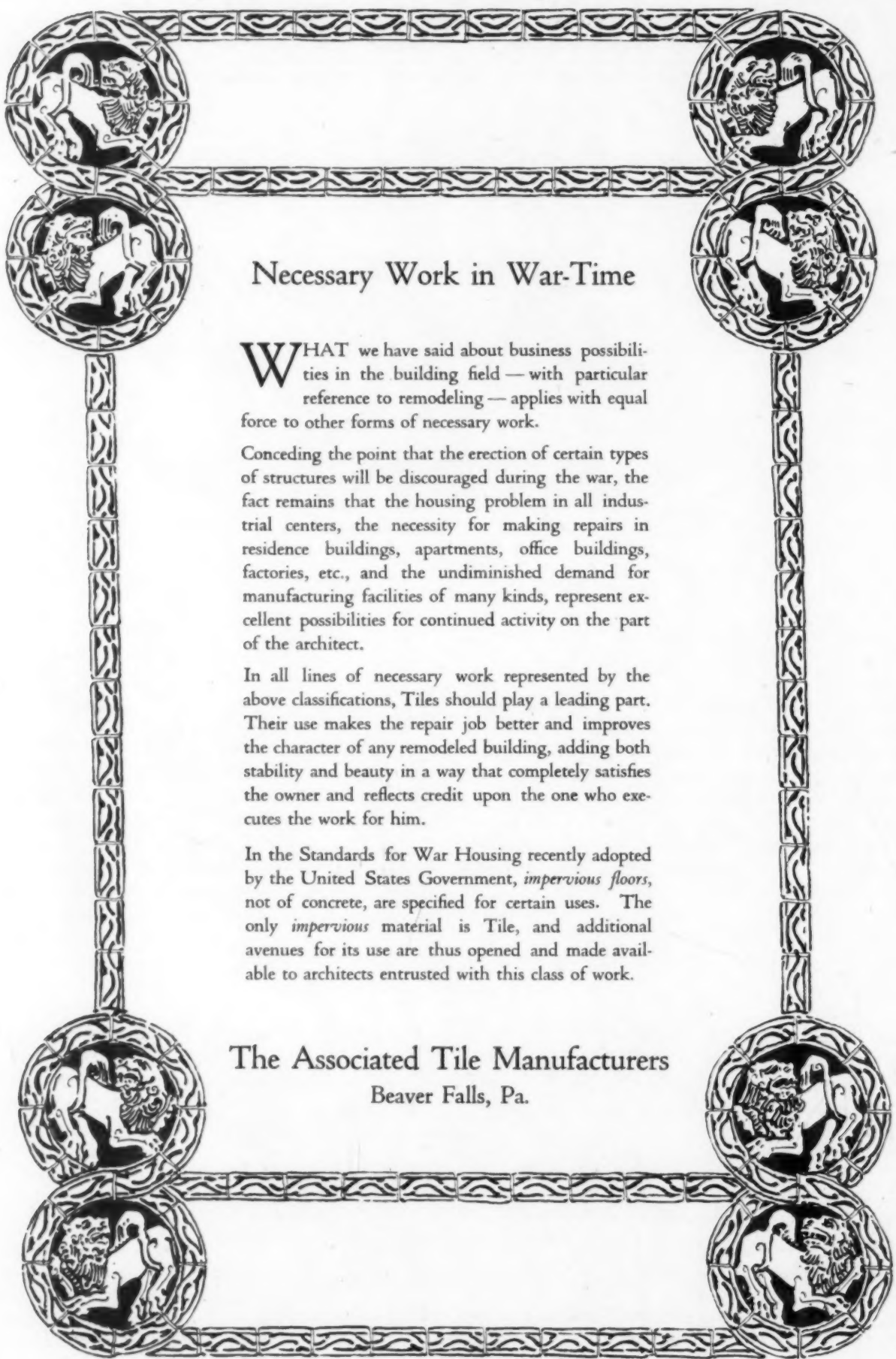
This development is being carried out under the direction of the Department of Transportation and Housing of the Shipping Board, which has received its appropriation and is now actively engaged in pushing to completion its program calling for an expenditure of \$50,000,000. The work is being directed by a well selected board, the personnel of which is made up in good measure by architects. The same is true of the Housing Bureau of the Department of Labor, more recently organized, although through the fact that the bill authorizing the expenditure of an additional \$60,000,000 under the President's direction, carried no appropriation, delays have crept in and no work is yet started. Several architectural firms have been assigned projects for development, however, and from present indications the character of the Government housing work promises to be satisfactory from standpoints of architecture and construction.

THE design of country clubs offers to architects an attractive field for the exercise of their talents. From very simple beginnings, country and golf clubs have grown to proportions where they assume an important part in American social life, and with their augmented functions better and more complex buildings have been demanded. In this issue we have brought together a selection of some of the best recent club houses from various sections of the country, forming a comprehensive review of recent work in this field. The construction of new club houses has undoubtedly been temporarily halted because of war conditions, but interest in them at this season of the year is general, and with the resumption of normal peace-time activities, the expansion of outdoor recreation and exercise will demand increased facilities for their enjoyment.



Floor Plan of Somerset Hills Country Club, Bernardsville, N. J.

Lord & Hewlett, Architects
(See Plates 79 and 80)



Necessary Work in War-Time

WHAT we have said about business possibilities in the building field — with particular reference to remodeling — applies with equal force to other forms of necessary work.

Conceding the point that the erection of certain types of structures will be discouraged during the war, the fact remains that the housing problem in all industrial centers, the necessity for making repairs in residence buildings, apartments, office buildings, factories, etc., and the undiminished demand for manufacturing facilities of many kinds, represent excellent possibilities for continued activity on the part of the architect.

In all lines of necessary work represented by the above classifications, Tiles should play a leading part. Their use makes the repair job better and improves the character of any remodeled building, adding both stability and beauty in a way that completely satisfies the owner and reflects credit upon the one who executes the work for him.

In the Standards for War Housing recently adopted by the United States Government, *impervious floors*, not of concrete, are specified for certain uses. The only *impervious* material is Tile, and additional avenues for its use are thus opened and made available to architects entrusted with this class of work.

The Associated Tile Manufacturers
Beaver Falls, Pa.



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Above is a photograph of a cross-section cut from a Barrett Specification Roof.

Note its great thickness.

Note the five alternating layers of Specification Pitch and Felt Waterproofing.

Note the heavy wearing-surface of Slag bound with Pitch.

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Booklet explaining our 20-Year Guaranty and a copy of The Barrett Specification free on request.

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TARGET AND ARROW ROOFING TIN



Tin Roofing to the Rescue Again

This illustration of a fire that occurred in Philadelphia in January, 1918, is of particular interest by reason of its location. The building destroyed is one of several old buildings remaining in a high value district. In the background on the right is first the Drexel Building, then the tower of Independence Hall, next the dim outline of the Public Ledger Building, then the high facade of the Curtis Publishing Company Building, and finally, on the extreme left, the massive granite pile of the Penn Mutual Life Insurance Company Building. The photograph was taken from the American Bank Note Company Building. Beyond the burned structure lies Independence Square. The upper floor of this building was gutted by the fire, but the tin roof held together and helped to keep the fire from spreading. This is a good example of one of the advantages secured in using TARGET AND ARROW roofing tin. Durability is of greater importance, however, and the durability of this heavily coated, hand-made tin plate has been proved in nearly a century's use.

TARGET AND ARROW roofing tin, formerly known as Taylor's "Old Style," is a specialty of ours, handed down from the early days of our business. In this brand we have preserved an old-time standard for the use and benefit of present-day architects. Few building materials have had so thorough a test of time as TARGET AND ARROW roofing tin. It remains to-day the same durable quality that we have supplied to American sheet metal workers for nearly a century. It costs a little more than other roofing tin, so you are not likely to get Taylor quality if you

write a specification that permits substitution. In your specifications for sheet metal work where roofing tin is required, simply call for Taylor's TARGET AND ARROW brand to be laid in accordance with the standard working specifications of the National Association of Sheet Metal Contractors. With a responsible roofing contractor, such a specification will secure you tin roofing work of the standard that has made the old-time roofing tin a watchword for durability and all-round satisfaction in service. Our catalog is in Sweet's — all issues.

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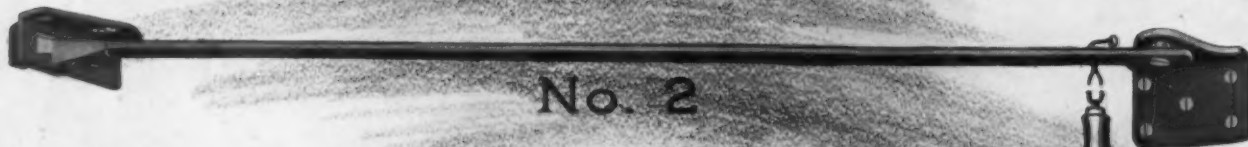
Plate No. 3—An attractive roof effect secured by the use of Conglomerate Brown Shingles.

© 1918, H. W. J. M. Co. N. Y.

RUSSWIN

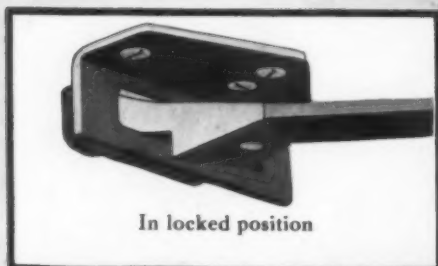
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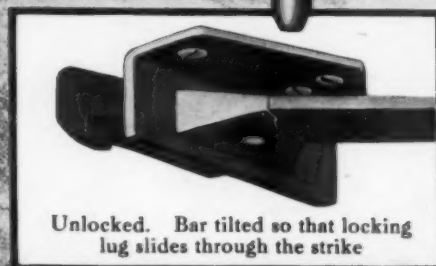


No. 2

FOR MILL
WAREHOUSE
OR
GARAGE
DOORS



In locked position



Unlocked. Bar tilted so that locking lug slides through the strike

For Right or Left Hand Reverse
Bevel Doors

THE advantage of the Russwin Hold-Open Arm over others of this type is in the Self-Adjusting feature which provides for any sag of the doors. All working parts have been planned to allow perfect freedom of action even when the doors have sagged, yet the locking action is positive under all conditions.

A pull on the chain tilts the arm, disengages the locking lug from the strike and allows the arm to slide through the strike. When pressure is removed from the chain the arm and locking lug drop into a locked position by gravity.

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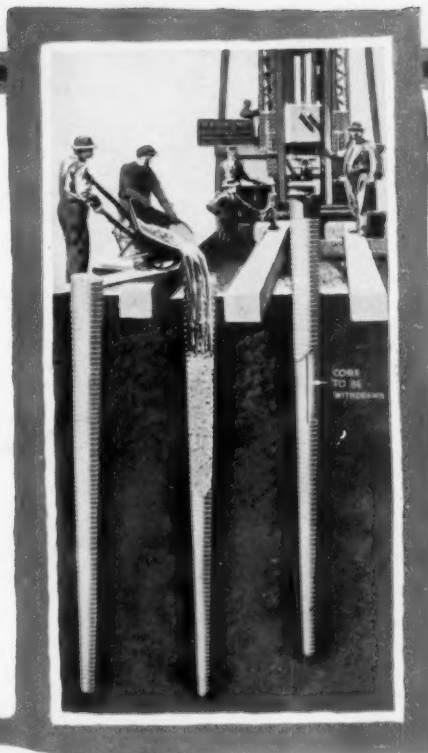
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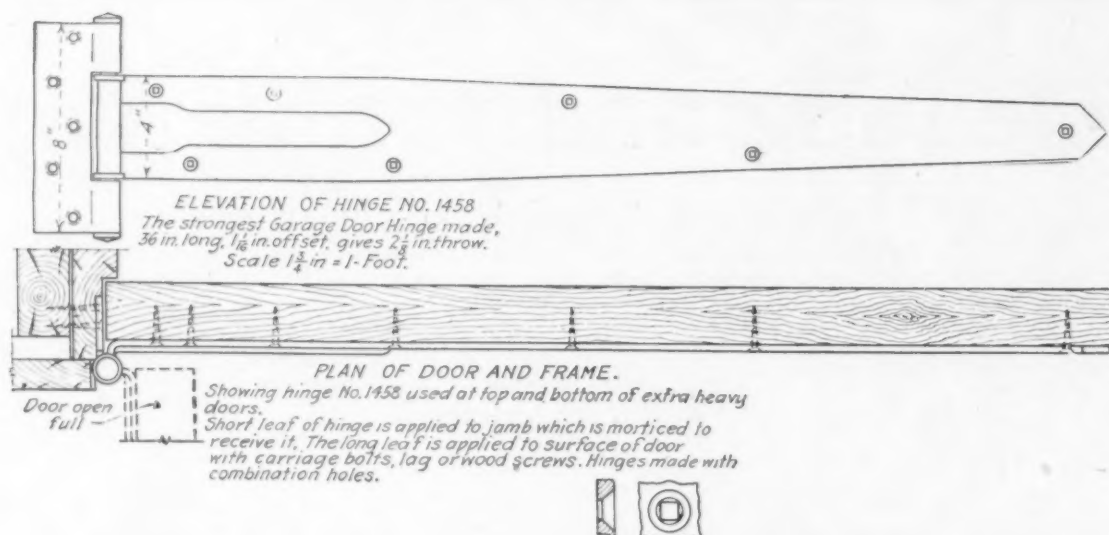
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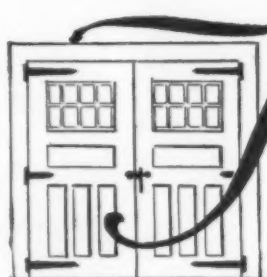
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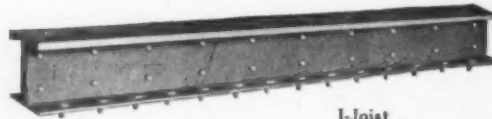
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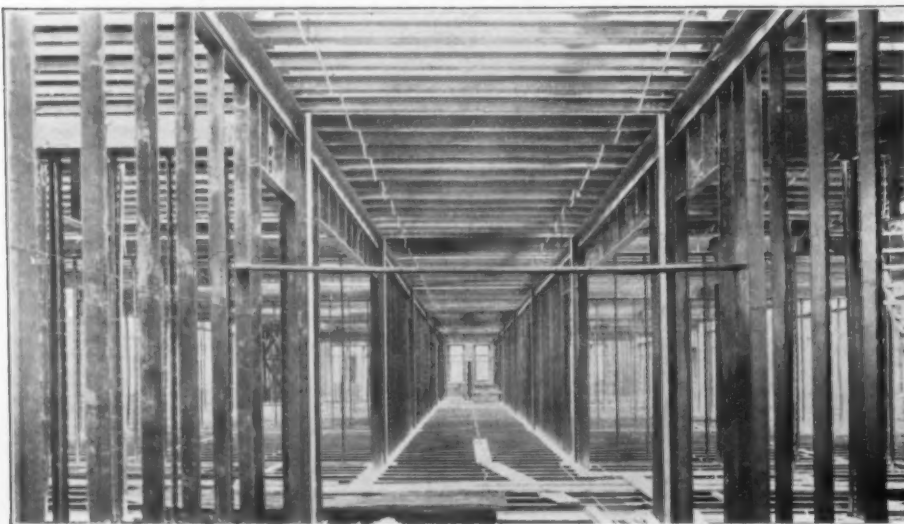


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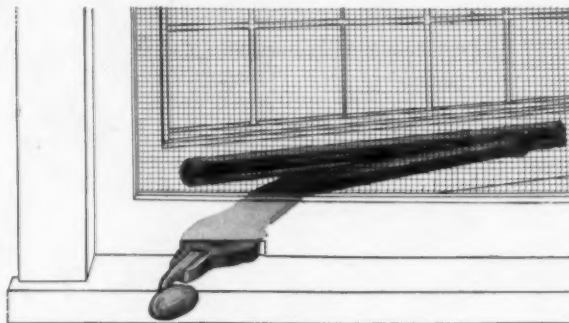
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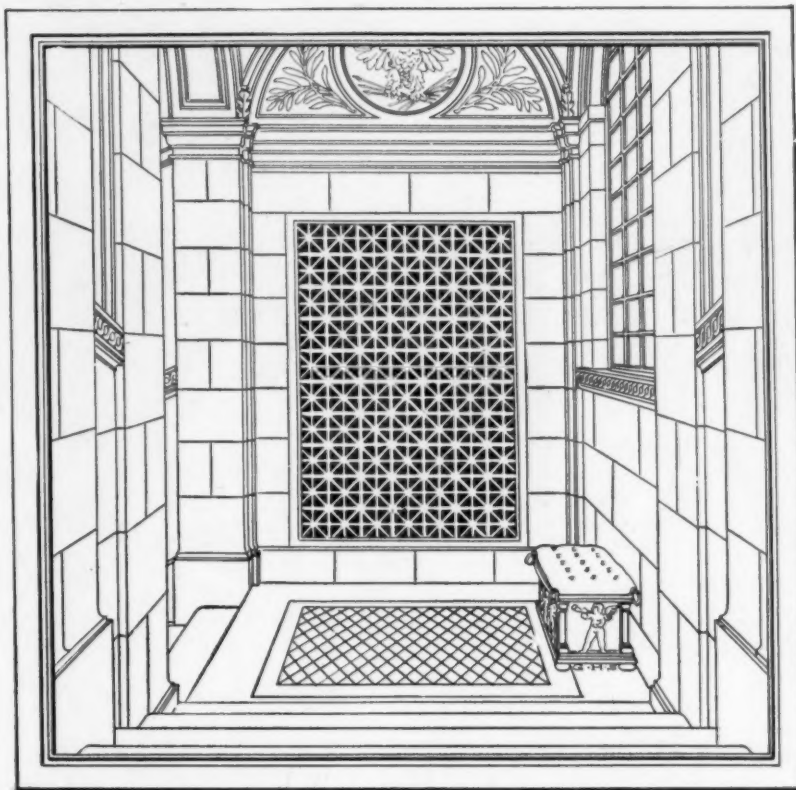
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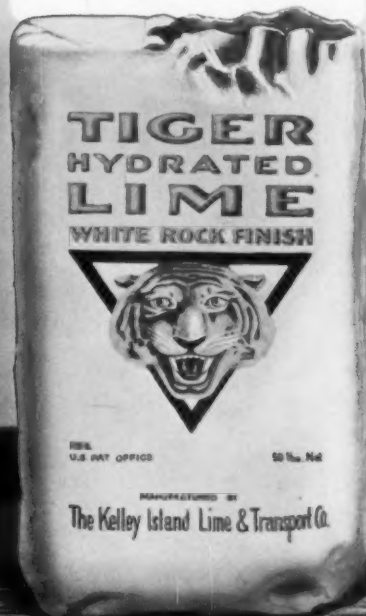
The End of a Perfect Day

"A big day's work and feeling fine."

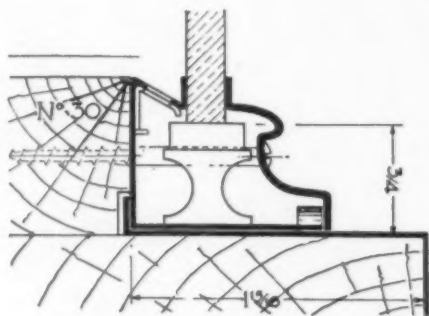
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Note also the efficient ventilation control— an exclusive KAWNEER feature. You can see this feature provides sufficient drainage and minimizes glass sweating.

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Pond Continuous Sash gives abundant ventilation without allowing rain to damage goods in process. Note the inside columns, also rail at top of building for hanging window cleaners' swings.

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Although we are building just one type of house at our own plants, we did not confine attention to that in our Industrial Housing number, but printed all the information available on several types of permanent homes of modern character and reasonable cost. Sixteen pages, with special supplement, giving news of actual building operations, photographic views, floor plans and useful working data. Three separate sheets of details on: (1) Poured Wall Houses; (2) Precast System Houses; (3) Stucco Type Houses. Free to all engineers, architects, contractors, builders and manufacturers interested in this live subject.

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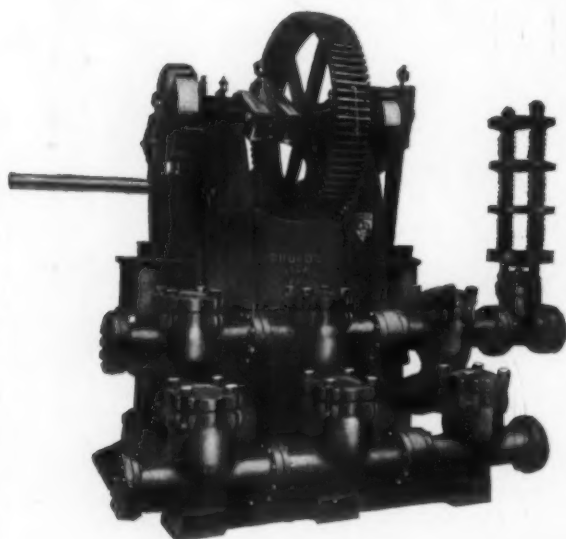
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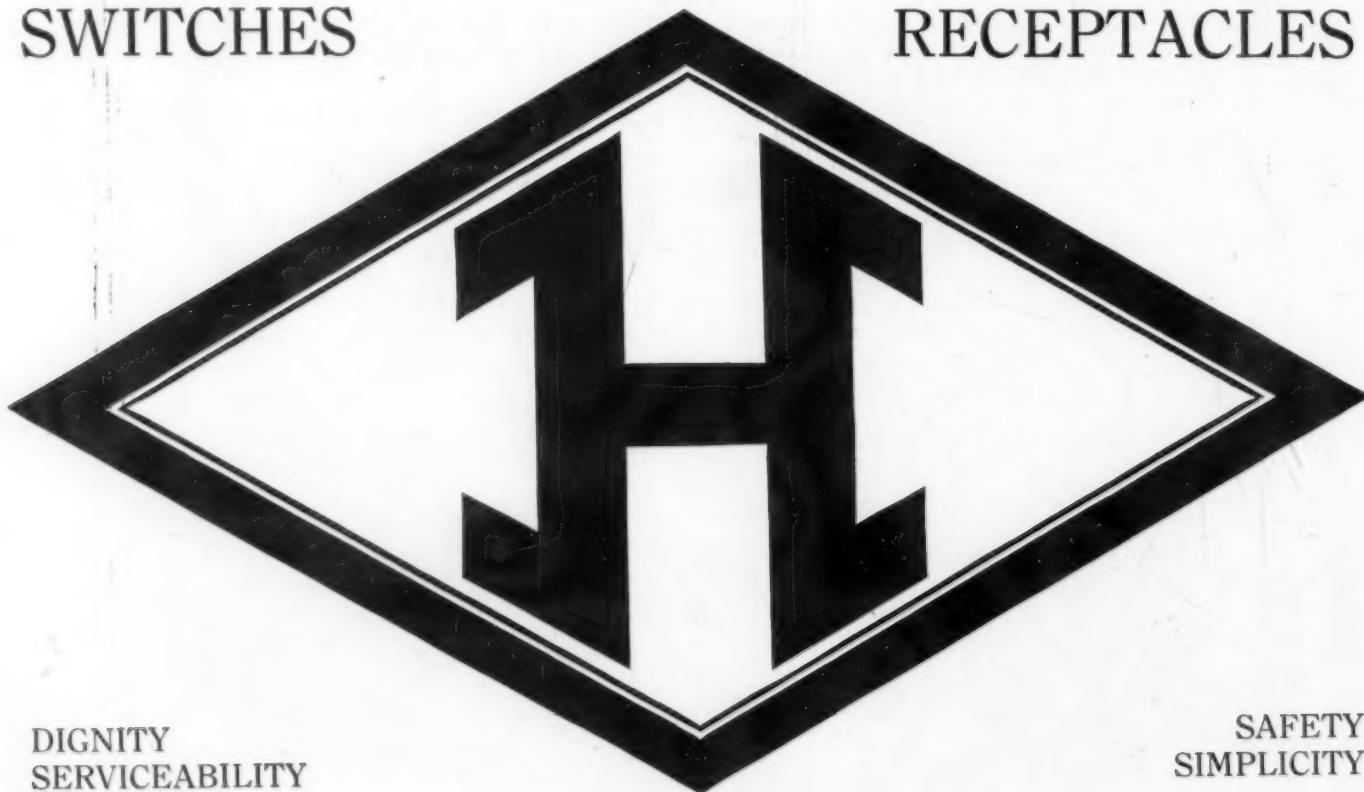
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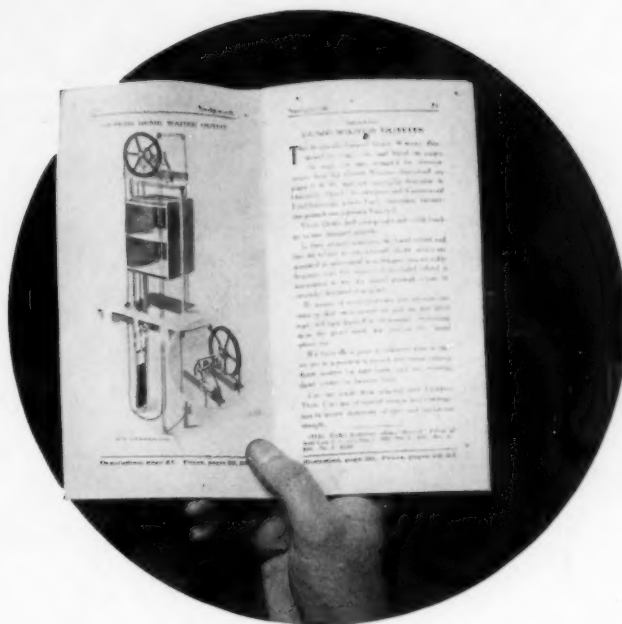
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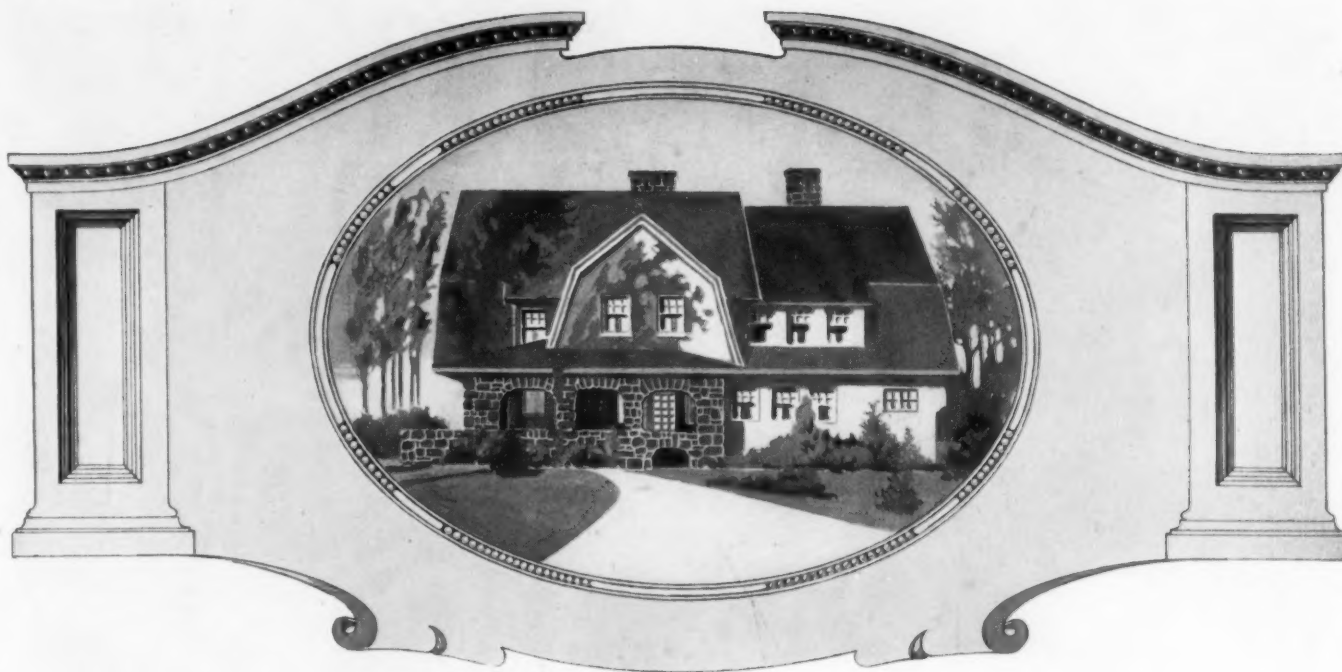
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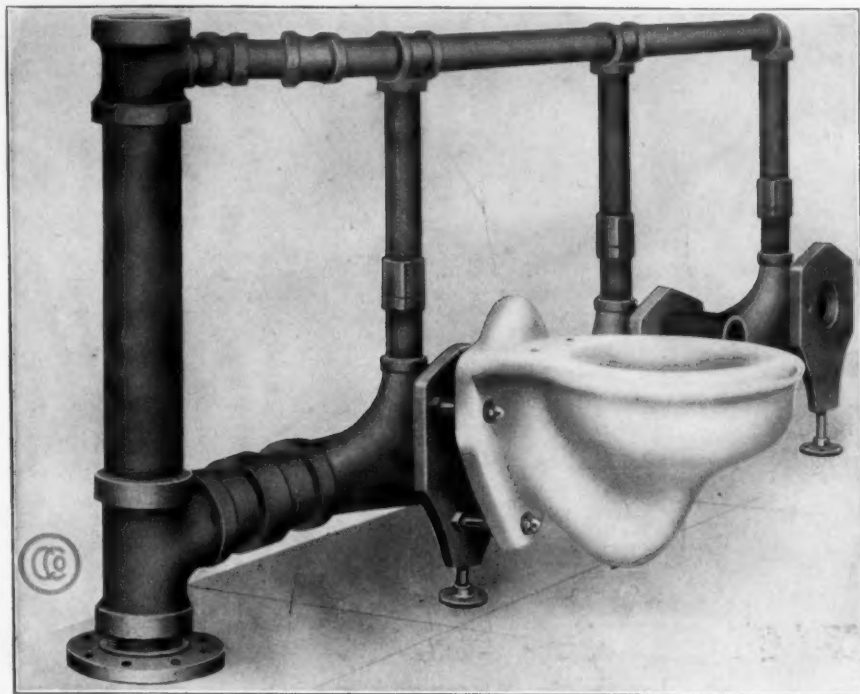


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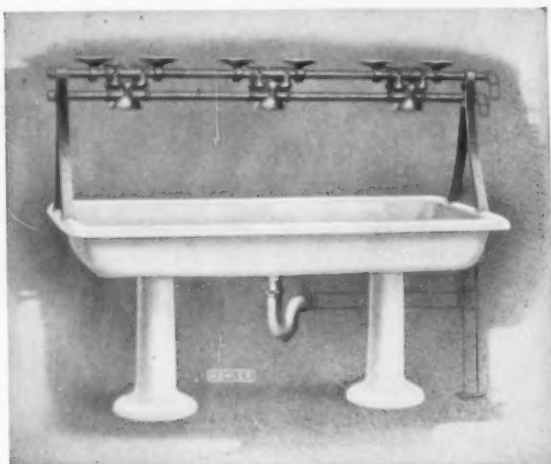


Plate F-914-A

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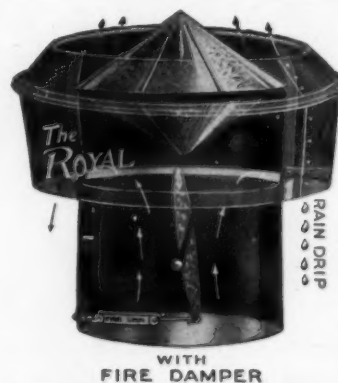
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¶ To readily identify "NATIONAL" material and as protection to manufacturer and consumer alike, the practice of National Tube Company is to roll in raised letters of good size on each four feet of every length of welded pipe the name "NATIONAL" (except on the smaller butt-weld sizes, on which this is not mechanically feasible on these smaller butt-weld sizes the name "NATIONAL" appears on the metal tag attached to each bundle of pipe).

¶ When writing specifications or ordering tubular goods, always specify "NATIONAL" pipe, and identify as indicated.

LOOK FOR THE MARK

Name Rolled in Raised Letters on National Tube Company Pipe

¶ In addition, all sizes of "NATIONAL" welded pipe four in. and under are subjected to a rolling process known as Spellerizing to lessen the tendency to corrosion, especially in the form of pitting. This Spellerizing process is peculiar to "NATIONAL" pipe to which process National Tube Company has exclusive rights.

¶ "NATIONAL" pipe was awarded the GRAND PRIZE (highest possible award) at Panama Pacific International Exposition, 1915.



SQUARE



POT

RADIATION

IS

**FIFTEEN PERCENT GREATER
THAN THAT OF ROUND POTS**

The BIG REASON why architects are now, a time when fuel conservation is so vitally essential, more than ever finding favor in Boynton Hot Air Furnaces and Hot Water and Steam Boilers. At minimum cost for fuel they serve both the Government and consumer.

Register yourself among "SQUARE POT" specifiers

Are you acquainted with our furnace specially designed for small bungalows and six-room industrial houses? Easily installed, economical in consumption, low in original cost and efficient in service.

Write us concerning it

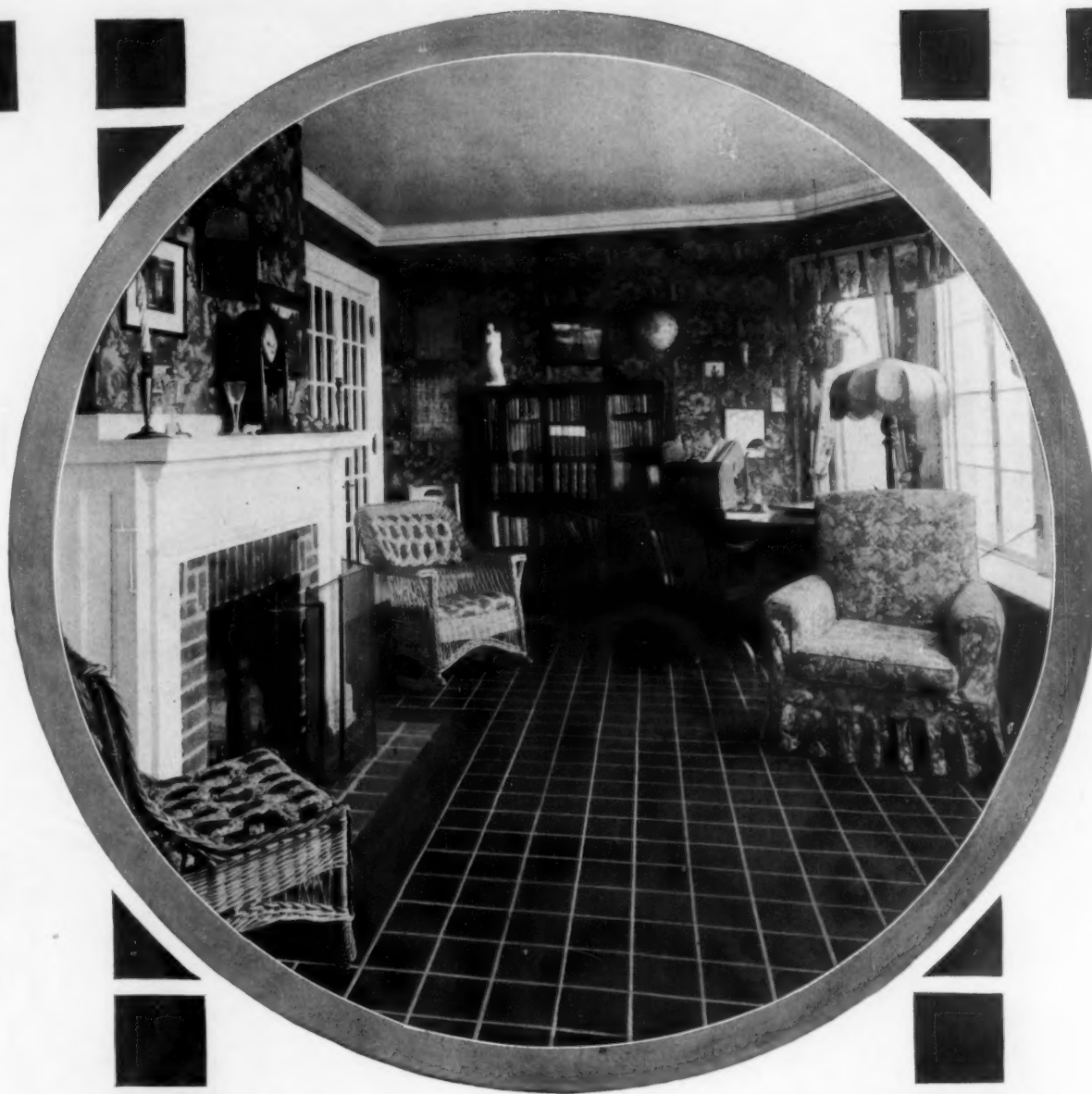
BOYNTON FURNACE COMPANY

"The Square Pot Makers"

BOILERS FURNACES RANGES

CHICAGO NEW YORK JERSEY CITY
129-131 W. Lake Street 106 W. 37th Street 230 Pacific Avenue





A Linotile floor that adds both warmth and tone to the sun parlor of T. E. Bastian, Rochester, N. Y. White strips, 3/8 inch in width, and 6-inch squares of red make up the field. The border is red.

Avoiding the Commonplace

A floor of distinctive coloring often lends the unusual note that lifts an interior above the commonplace.

To obtain just the correct tones and designs without sacrificing utility, many architects have turned to

LINOTILE

"The Floor That's Built to Fit the Room"

This combination of powdered cork, wood flour, oxidized linseed oil and various gums and pigments makes an ideal flooring material, at once durable, sanitary and quiet. It can be had in eleven beautiful shades, in several shapes and many sizes.

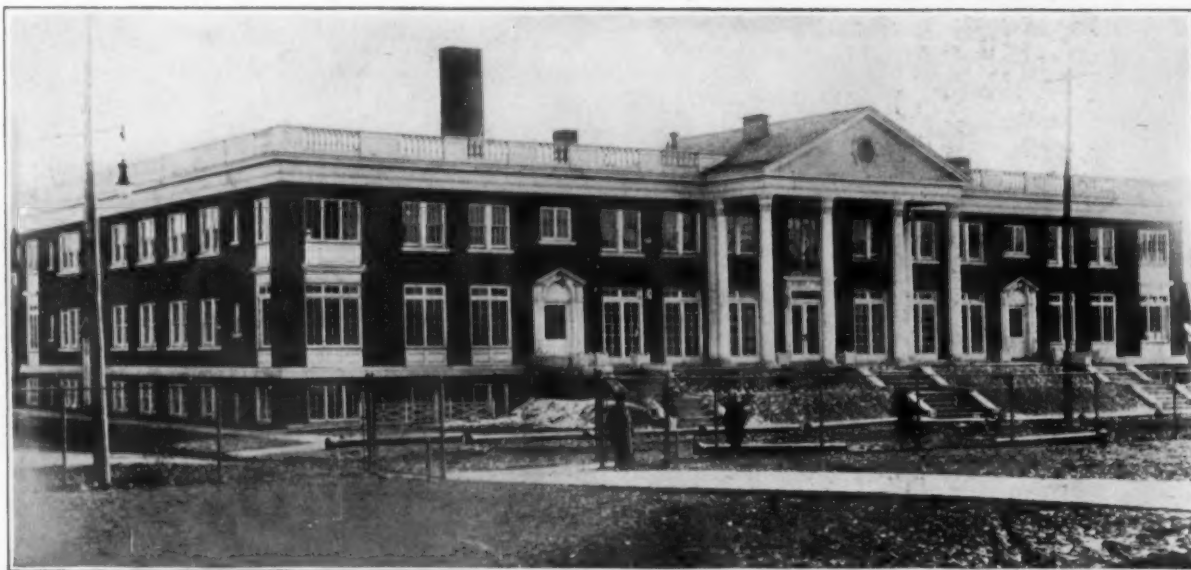
To convey any conception of the beautiful and diversified effects these colors permit, is impossible in the limits of this advertisement. You must see the forty-page catalogue in colors to appreciate the real possibilities of Linotile floors. This book and a sample will be cheerfully sent on request.

Armstrong Cork & Insulation Co., 132 Twenty-fourth St., Pittsburgh, Pa.

Also manufacturers of Nonpareil High Pressure Covering for steam lines; Nonpareil Insulating Brick for boiler settings, breechings, etc.; Nonpareil Corkboard Insulation for refrigerated rooms; Nonpareil Cork Machinery Isolation for deadening the noise and vibration of motors, fans, pumps, etc., and Armstrong Circle A Cork Brick for horse and cow stalls.

"Notice Any Smoke?"

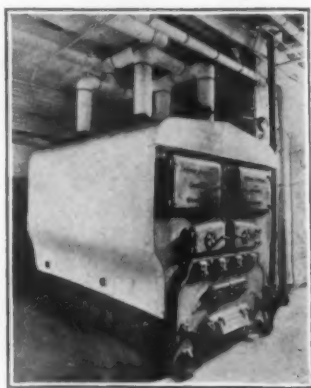
There Isn't Any—



J. Philip McDonnell
Architect

Colonial Apartments
Detroit, Michigan

R. P. Peckham
Heating Contractor



Showing Boiler

Successfully heated during the severe winter
of 1917-18 with a

Capitol Smokeless Boiler burning bituminous coal

Note:—The above illustration is a reproduction of an actual photograph (without retouching) taken immediately following a firing period, and while the thermometer in the open air registered 30°.

"It's the TEST that tells"

UNITED STATES RADIATOR CORPORATION

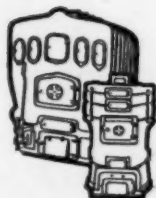
GENERAL OFFICES: DETROIT, MICHIGAN

BRANCH OFFICES IN PRINCIPAL CITIES



Note the depth of the section leg corrugation. It is no mere wrinkle in the air. It is both broad and deep.

*Burnham
Boilers*



Lord & Burnham Co.

Irvington, N. Y.

Representatives in All Principal Cities

Ashes insulate ! How this is prevented

MOST boiler fires grow dead around the edges—grow dead because most boilers have one big center flue at the back, but no side flues.

The Burnham has no back center flue. It has a side flue between *each* section on *each* side. The draft is equalized. The edges of the fire are practically as lively as the center.

The leg of each section has a deep corrugation, against which the live edge fire directly contacts. That corrugation prevents the close, flat packing of the edge ashes, so assisting in keeping a draft vent.

It adds greatly to the active fire surface—a surface that in most boilers is half dead.

So this ends Burnham Boiler chat Number Five of which there are twelve more to follow.

"Sirocco"

Sirocco Products

¶ Are suitably serving to heat and ventilate the Indianapolis Public Library, Indianapolis, Ind.

¶ Every corner and alcove in this magnificent monument to literature is adequately and evenly heated and ventilated by the four Sirocco Fans and Heater Coils which make up the unit installed in this building.

¶ Prominent Architects and members of the Engineering profession everywhere are particularly specifying Sirocco Products because a Sirocco installation is the best guarantee of quality together with satisfactory and economical service that can be obtained.

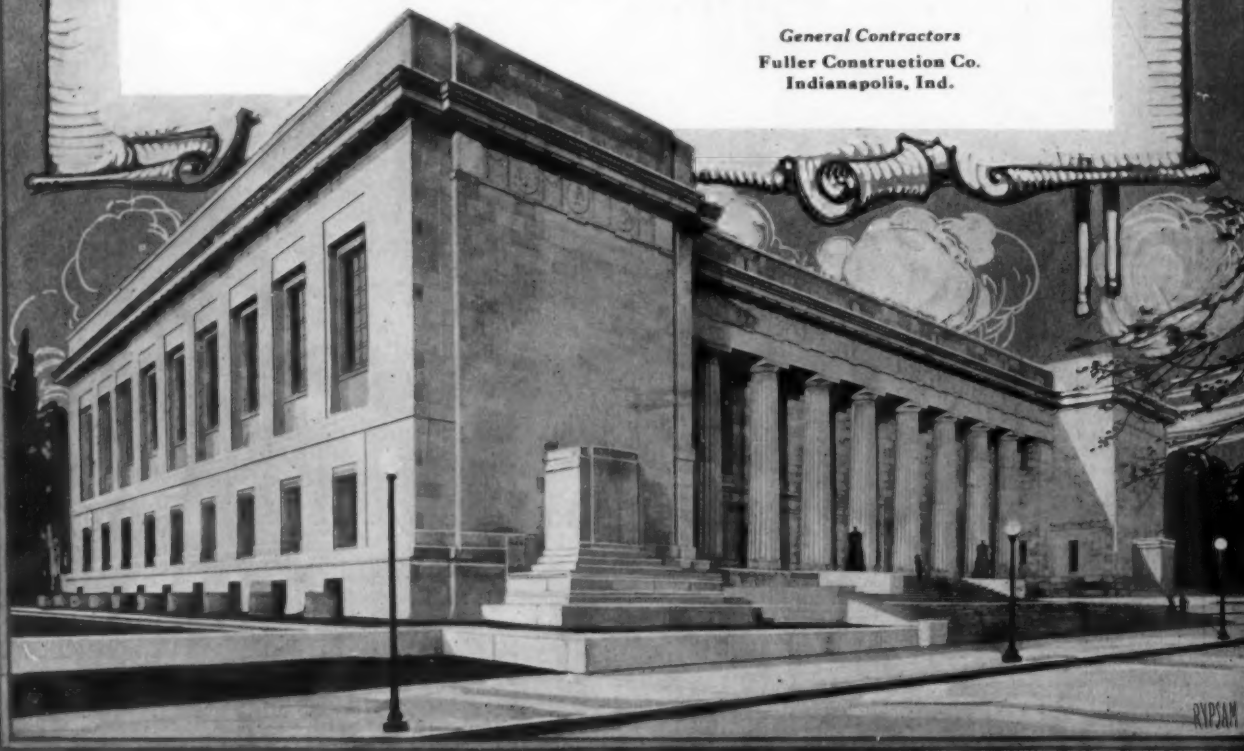
¶ The service of a large force of salesmen with a thorough engineering training is available to you in all parts of the country.

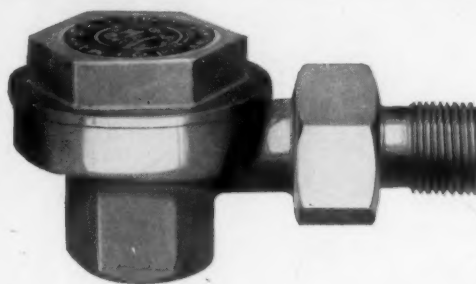
American Blower Company Detroit, Michigan

Architects: Paul Cret, Zantzinger, Borie & Medary, Philadelphia, Pa.

Heating Contractors: Wells & Newton, New York, N. Y.

General Contractors
Fuller Construction Co.
Indianapolis, Ind.





THE DUNHAM RADIATOR TRAP, pictured above, is one of the fundamentals of DUNHAM HEATING SERVICE. It was placed on the market in 1903. Immediately a storm of criticism was directed against it, so radically different was it from anything of its kind before. Probably no mechanical device ever encountered such intense opposition or made its debut under such trying circumstances.

Despite the coolness of its reception, The DUNHAM RADIATOR TRAP quickly grew in favor with architects and heating engineers until today it is acknowledged to be without an equal in its field.

The numerous imitations which have been exploited, and the persistency of imitators in seeking to adapt Dunham principles, is the surest evidence of the correctness of our belief that there is not any other trap that is "just as good" as the Dunham.

The simplicity of The DUNHAM RADIATOR TRAP is one of its distinguishing features. It comprises a body, a cover and a thermostatic disc which is secured in the cover. There are no loose parts, no sliding contacts, nothing to gum up and no guide or pin to obstruct the valve opening. There is a flat valve and seat with liberal valve opening. The valve is self-cleaning. The action of the disc is positive and the valve seats squarely, like a globe valve, the tightest of all types of valves and one presenting little opportunity for uneven wear. The body is standardized, as is also the cover and disc, thus giving the further advantages of interchangeable parts.

Architects and Heating Engineers will appreciate the significance of the fact that cast iron does not enter

into the manufacture of the Dunham Trap. The metal used is entirely bronze and brass.

The function of The DUNHAM RADIATOR TRAP is to maintain the radiator at the point of its highest heating efficiency. To do this the working parts of the trap must, naturally, be subject to the actual conditions existing *within* the radiator. The thermostatic disc within the trap is fully exposed to the conditions within the radiator, and, as it is never shut off from them, it therefore responds instantly to any change taking place therein. The DUNHAM RADIATOR TRAP thus automatically relieves the radiator of all air and water and holds all the steam within the radiator, there to perform its maximum heating work under practically perfect conditions.

The DUNHAM RADIATOR TRAP is being widely advertised by the C. A. Dunham Company. All over the country through the medium of magazines of national circulation, the message of its efficiency as a coal saver is being spread. Probably at no time in the history of our Nation has such a device been so urgently needed. **SAVE COAL—SAVE COAL—SAVE COAL**—is the slogan that is rousing the people to a realization of the fact that War is a serious business and demands the cooperation of every single individual in the country in one way or another. The DUNHAM RADIATOR TRAP is "doing its bit" and doing it well.

It is our desire that every architect and heating engineer in the country become familiar with this little device.

To this end we are spending many thousands of dollars that might otherwise be used in expanding our business. May we have your help and cooperation?

The DUNHAM
HEATING SERVICE

C. A. DUNHAM COMPANY, Fisher Building, CHICAGO

Factories: Marshalltown, Iowa
Toronto, Canada

Branches in 34 cities of United States
and Canada

CLARAGE

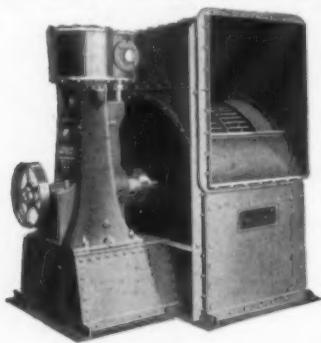
KALAMAZOO

Multiblade Fans

for

Heating and Ventilating

Are used and indorsed by the leading Architects, not once, but again and again.



Clarage Multiblade Fans are so designed and constructed that they give *Unusual Service with Very Little Attention.*

These Multiblade Fans really *Save Power* because of the peculiar qualities of the Clarage Multiblade Wheel and because they are furnished with *Superior Bearings*, dust-proof and oil-tight.

You will be interested in knowing more about our Fan Equipment. Write to-day for further information.

CLARAGE FAN COMPANY.

KALAMAZOO-MICHIGAN-U. S. A.

New York

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IN VIEW OF THE PUBLIC'S SUDDEN REALIZATION THAT

"Signed Lumber is Safe Lumber."

and their knowledge that "TIDEWATER CYPRESS" is the distinctively DECAY-RESISTING kind, it's NO WONDER "CLIENTS ARE

INSISTING ON

TRADE MARKED

CYPRESS

(The true 'Wood Eternal')"

Accept no
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this mark



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mechanically indented in the end of *EVERY PIECE*
(or stamped on every bundle of small items).

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Southern Cypress Manufacturers' Association

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Building, New Orleans, La.

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INSIST ON TRADEMARKED CYPRESS AT YOUR LOCAL LUMBER DEALER'S. IF HE HASN'T IT, ASK HIM WHY AND LET US KNOW. WE WILL SEE THAT YOU GET IT.



OAK, as a CABINET WOOD, is serene in its conscious superiority.

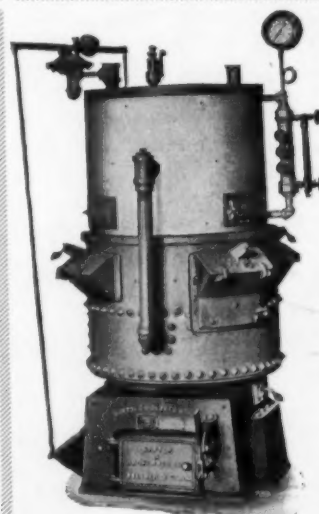
From the aristocratic dignity of the chateau to the sweet homey-ness of the cottage or apartment—and from the earliest middle ages to the present discriminative moment OAK, "that sturdy friend of Art" and "the world's premier hardwood," has remained the first choice of those who combine a knowledge of truly *permanent values* with a sense of the highest artistic adaptability.

Responsive alike to the best skill of the artisan and the artist, OAK combines all the qualities which contribute most to a home whose FURNITURE must (because of the little folks) at the same time impart ideas of beauty, dignity, poise and permanence—and good-naturedly repel the onslaughts of buoyant youth.

"There is no finer heirloom than good OAK furniture." There is no more *safe and enduring* investment—none better worth *insisting* upon. *Have you tried INSISTING?*

AMERICAN OAK MANUFACTURERS' ASSOCIATION write personal letters worth getting. Tell us of your special problems. ADDRESS ROOM 1402, 14 MAIN STREET, MEMPHIS, TENN.

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of the Gorton Self-Feeding Boiler is demonstrated by the fact that many of the boilers installed over 25 years ago are still in use giving entire satisfaction.

Efficiency

The Gorton Self-Feeding Boilers are built on the lines of Power Boilers, using the same material, thus securing the greatest Strength, Durability, and highest Efficiency.

The Gorton Self-Feeding Boiler gives a steady heat with attention only morning and night; its construction insures complete combustion of the gases and prevents the waste of coal.

See pages 2, 3, 4, 6, 8, 10, 11, and 13 of Catalog No. 88.

OUR NEW NO. 88 CATALOG IS READY—WILL BE SENT UPON REQUEST

Gorton & Lidgerwood Co.

96 Liberty Street, New York

All Gorton Self-Feeding Boilers built to the
"A. S. M. E. Standard"



Varnish in Architecture

Wall and Ceiling Treatments

As every architect knows, the treatment of walls and ceilings is a very essential factor in the finishing scheme of any room.

Handsome effects may be produced with wall papers, but the utmost possibilities of this decorative medium cannot take such high artistic rank as appropriately tinted surfaces.

The most elaborate wall paper treatment palls in time, and it is the neutrality of the solid tinted wall, with its absence of arbitrary design, that makes it out-live other styles of mural decoration.

Artistic Color Tones, without gloss, in 21 shades can be produced with **Luxeberry Wall Finish**. The effect is quiet, harmonious and restful. The finish is washable and can be applied to all surfaces of plaster, wood, metal, burlap, fibre board, canvas, papier-mache, and other interior treatments.

LUXEBERRY ENAMELS—in pure white and three shades of gray. Dull or gloss effects, durable, washable.

LIQUID GRANITE—floor varnish. Makes a smooth, satiny finish. Lasting, waterproof, marproof, also adapted for bathrooms, window sills and casings, and all interior work where great durability is desired.

LUXEBERRY WOOD FINISH—for general interior work. Develops and preserves the grain of all woods, and makes a handsome and lasting finish. Rubs perfectly.

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BERRY BROTHERS
(INCORPORATED)
World's Largest Varnish Makers

Established 1858

Factories: Detroit, Mich., Walkerville, Ont., San Francisco, Cal.

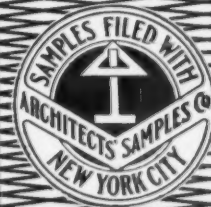
Scrap Book Item

Raising the Grain of the Wood

The ridgy surface that sometimes mars the appearance of the finish is usually produced during the operation of staining. Water stains are especially apt to raise the grain unless carefully applied. After applying water stains they should be wiped in with a bunch of cotton waste or a pad of cheesecloth. This serves the double purpose of making a uniform color tone, and absorbing the surplus moisture that would cause the wood to swell—or, raise the grain, as it is called.

Cut It Out

(461)



Finished
with
Liquid
Velvet



Langdon
Building,
New York
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O'Brien's

When it comes to walls and ceilings, the interests of a client can be served best by the specification of *Liquid Velvet*, the oil base flat wall enamel.

Liquid Velvet covered walls and ceilings are beautiful — and *permanent*. They may be washed with soap and water whenever necessary.

Liquid Velvet will not crack, chip or peel and has unusually large spread. It is acknowledged by leading architects everywhere as distinctly superior to similar finishes. Made in white and attractive colors.

Other O'Brien products of unusual merit are Flexico Enamel, Master Varnish and Pyramid Floor Finish.

Portfolio of Specification Data sent on request

The O'Brien Varnish Co.

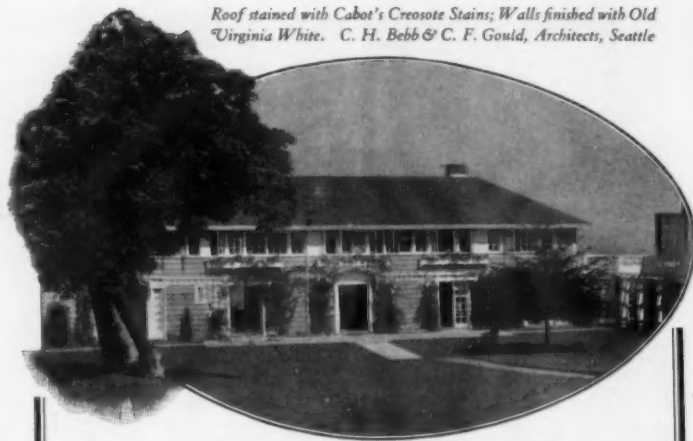
1105 Washington Ave., South Bend, Ind.

Varnish Makers for Over Forty Years

Liquid Velvet
THE SPECIFIED BRAND

THE ARCHITECTURAL FORUM

Roof stained with Cabot's Creosote Stains; Walls finished with Old Virginia White. C. H. Bebb & C. F. Gould, Architects, Seattle



Cabot's Old Virginia White

As Soft and Brilliant as New Whitewash and as Durable as Paint

There is no "painty" look to Old Virginia White. It has all the virtues of paint in cleanness and durability, and is much cheaper; but its distinction lies in its cool and brilliant pure white of soft unpainty texture, like that of fresh government whitewash. It is used on wood, bricks, stucco, concrete or stone.

Cabot's Creosote Stains

Ideal for Housing Developments

Cabot's Stains give beautiful coloring effects, preserve the wood and cost less than half as much as paint. Any unskilled workman can apply them. They are ideal for staining small houses, of siding, shingles or boarding.

*You can get Cabot's goods all over the country.
Send for samples and name of nearest agent.*

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Cabot's Stucco and Brick Stains, "Quilt," Damp-proofing, Conserve Wood Preservative, etc.

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THE HOTEL MIAMI

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Architects,
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Why should not your investment be equally intelligent, successful and distinguished? Why pay for any imported wood not one whit finer?

RED GUM

veneers offer you an artistic latitude not otherwise possible except in woods costing you a great deal more money.

Write us for literature, samples and full information.

Gum Lumber Manufacturers Ass'n

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I NEVER get tired of looking at our beautiful stairway," said the happy young wife. "I always wanted white balusters with the rich, mahogany-red rail. And the stained paneling on the other side is just as lovely—it makes such a charming contrast."

"Yes," said her husband. "If we had used the expensive hardwoods, we never could have afforded such luxuries. Nor could we have had the paneling in our living room nor our beautifully polished floors. The architect told me that people were just beginning to appreciate the possibilities of North Carolina Pine for interior work such as this. He said it will be used much more extensively because it is so economical and such an excellent base for stains and enamels. Besides there are few woods, and certainly none at so low a price, which have such beautiful figure."

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Interior Semi-Gloss

A beautiful white enamel giving rich egg-shell gloss effect. Durable, easy working, covers perfectly, out of dust within a few hours.

Trade **Matte White Enamel** Mark
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A practically colorless varnish producing a dead or matte finish without rubbing.

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A varnish practically proof against heel marks or water spots. Dries with a satin-like finish. Provides the utmost in service and beauty. Contains no wax.

Send for finished panels

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KY-AN-IZE

WHITE ENAMEL

SPECIFIED

And used exclusively for all white finish in the new home of the New York
RACQUET AND TENNIS CLUB
Park Avenue and Fifty-Second Street
McKim, Mead & White, Architects

Boston Varnish Company
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are the right materials to choose for tinting and whitening the interiors of workmen's cottages, hotels, apartments and all industrial or storage buildings.

Calcimines are glutinous color compositions intended chiefly for decorative purposes.

Water paints are caseinous color compositions intended chiefly for whitening purposes.

Both furnished in condensed powder form requiring the mere addition of water. Both adhere to wallboard, wood, canvas, plaster, cement, concrete, hollow tile and brick.

One coat usually makes a good job, costs a mere trifle and lasts for years.

Cheaper than oil paint or wallpaper.

The best calcimines are **MURALITE** and **CALCITINE**. The best water paints are those called **PERMANITE**.

M. EWING FOX CO.

Manufacturers

New York

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THESE houses and thousands of others have been preserved by the Bay Stater. He puts a coat or two of "Bay State" on your house and it's *safe and sound*. Rain, sleet, sun and all the rest have no effect on it.

This famous Coating comes in white and a variety of tints. It's sure cure for worn walls of brick, cement or stucco.

Write us. We'll send you Booklet No. 10—full of photos, facts and figures. Also a free sample of any tint you want.

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*"Beautiful Birch
for
Beautiful Woodwork"*

Beautiful **birch**

With housing occupying so prominent a position in every discussion of building matters it is well to focus on birch, the wood supremely adaptable to the small or medium sized house.

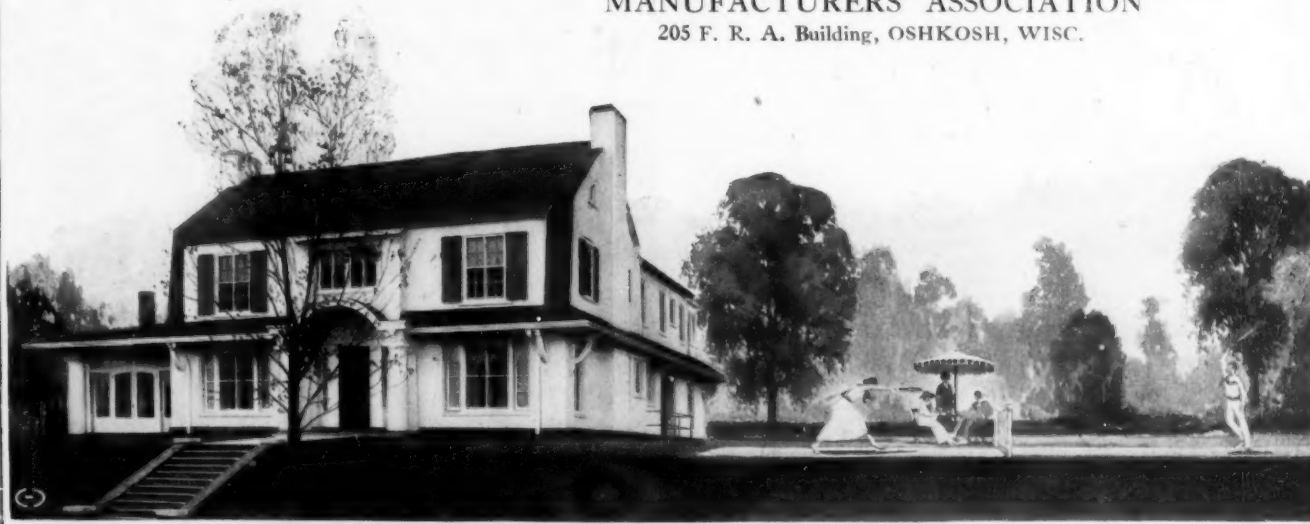
Birch is beautiful in itself, it is hard, non-absorbent, strong, durable and stays wonderfully well in place whether in trim, veneer or furniture. It receives all finishes equally well and is particularly valuable as a ground for enamel, which it holds very permanently.

Its moderate price makes it available to all.

*Six handy finished samples and
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You architects who are facing the big industrial-housing problems of the country need not spend your time designing the doors and windows, the trim or built-in furniture for your workingmen's homes — we have done it for you.

Simple in design, sturdy in construction, thoroughly standardized in size and quality, they are ready for your use. You have only to select from our very complete line the units that will fit your blue-prints.

The use of **CURTIS** standard doors and windows will save both time and money and help insure

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*Write to-day to our well-manned Service Bureau. They will gladly go over your plans and show you how and where **CURTIS** Woodwork can increase the value and decrease the expense of the houses you are planning.*

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Clinton, Iowa Lincoln, Neb. Minneapolis Wausau, Wis. Topeka, Kan.
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The Makers of **CURTIS** Woodwork guarantee complete satisfaction to its users.

"We're not satisfied unless you are"

1866
CURTIS
WOODWORK

"The Permanent Furniture for Your Home"



This is a Section of Untreated Concrete Floor~

If You Have a Concrete Floor Job in Hand

you can readily satisfy yourself that there is a sure, safe way to dustproof and wearproof concrete floors by applying the liquid chemical

LAPIDOLITH

TRADE MARK

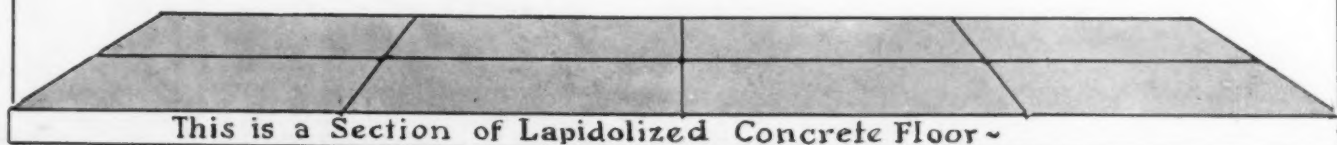
We can doubtless refer you to a nearby architect who has used this material or to a lapidolized floor in your vicinity.

Lapidolith is readily flushed on new or old concrete floors. Used for years on thousands of concrete floors.

Write for references and full information to Dept. 4

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Manufacturers of Cemcoat, the Washable Wall Coating



This is a Section of Lapidolized Concrete Floor~



DOORWAY
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Newburyport, Massachusetts

MANY architects have told us that there has been a marked change recently in the attitude of home-builders toward

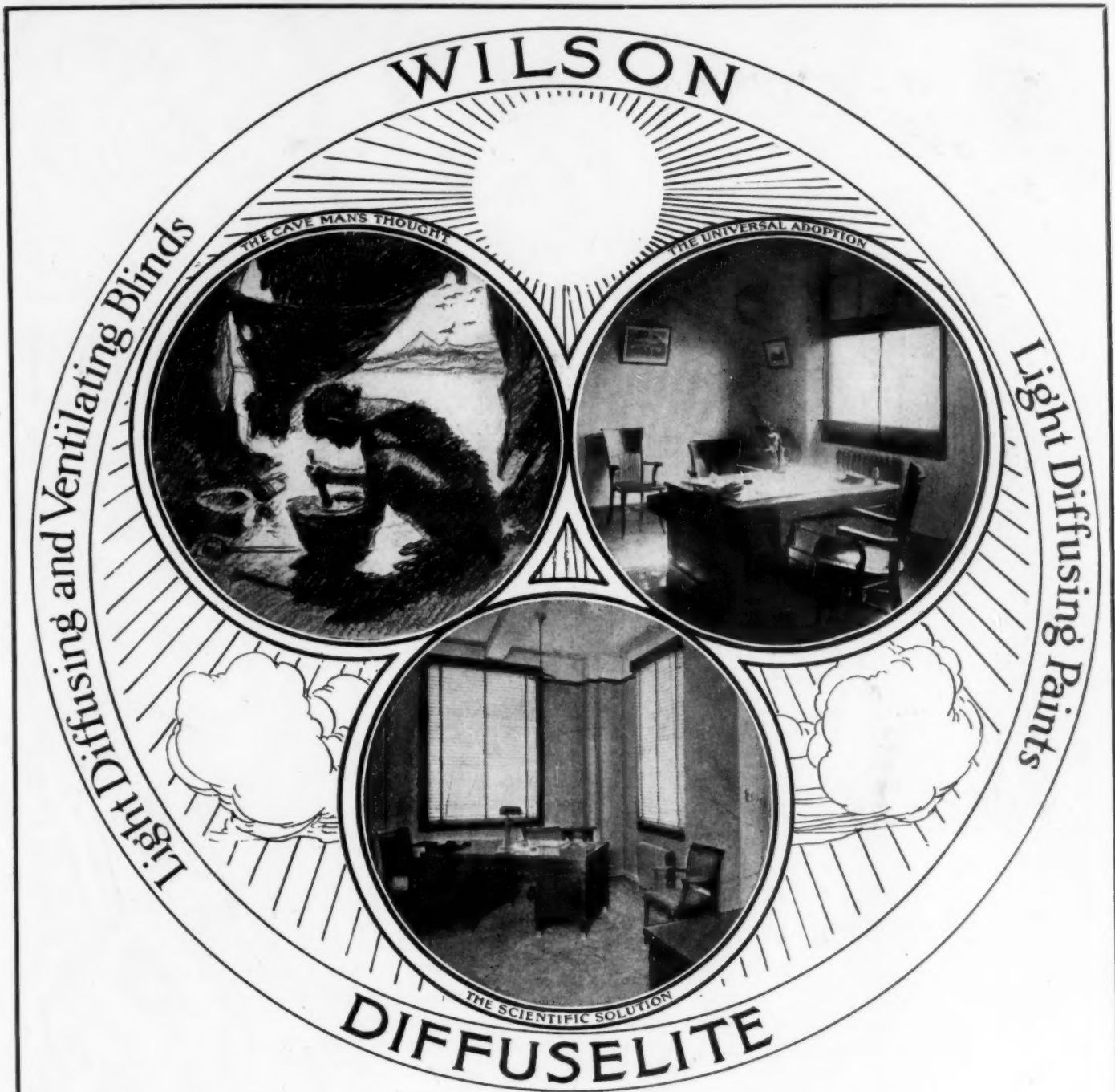
WHITE PINE

There is a growing realization on the part of builders that service per dollar is much more vital than first cost.

They are learning that White Pine for outside uses is worth more at a slightly higher price than less durable and less satisfactory woods.

*Address WHITE PINE BUREAU,
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Representing
The Northern Pine Manufacturers'
Association of Minnesota, Wisconsin
and Michigan, and The Associated
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NATURAL DAYLIGHT CONTROLLED FOR QUANTITY, QUALITY AND SPECIFIC BRIGHTNESS
BRIGHTNESS CONTRASTS, GLARE AND LINES OF DEMARCATION ELIMINATED
LIGHT PERFECTLY DIFFUSED AND ANY DESIRED TONE EFFECT ACQUIRED

ACCOMPLISHED THROUGH

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AGENCIES IN PRINCIPAL CITIES

For further information and interesting data relative to this subject, send to N. Y. Office for Leaflet No. 11 in the series, "Illuminating and Ventilating of Modern Buildings"

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GEO. B. POST & SONS and MAURAN, RUSSELL & CHAPMAN
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FAIRMONT HOTEL, SAN FRANCISCO.
DUFFY BROS. PLUMBERS - REID BROS. ARCHITECTS



ADOLPHUS HOTEL ANNEX, DALLAS.
THE HAMILTON CO. PLUMBERS. LANG & MITCHELL, ARCHT.

HOTELS are great to the extent to which they approximate their real purpose—to give service.

These are preferred hotels. Everything has been done that is possible to delight the eye and comfort the physical man. The Architects' names assure that.

The bath is the one service specified before registering. Pleasing the guest is assured in these representative hotels by installation of "Standard" Plumbing Fixtures.

Acquaintance with "Standard" Products and the "Standard" organization proves our service a convenience and pleasure. We invite you to call freely upon any branch where also "Service is Supreme".



WELLINGTON APARTMENT HOTEL, PHILADELPHIA.
LOUIS WANNER, PLUMBER - FRED. WEBBER, ARCHT.

"Standard" Showrooms and Service Stations

NEW YORK	PITTSBURGH	E. ST. LOUIS	TOLEDO	YOUNGSTOWN	NASHVILLE	HOUSTON	SAN FRANCISCO
BOSTON	CHICAGO	ERIE	CINCINNATI	WHEELING	NEW ORLEANS	SAN ANTONIO	LOS ANGELES
PHILADELPHIA	DETROIT	ALTOONA	COLUMBUS	HUNTINGTON	KANSAS CITY	FORT WORTH	TORONTO
WASHINGTON	ST. LOUIS	CLEVELAND	CANTON	LOUISVILLE	DALLAS	MILWAUKEE	HAMILTON

Standard Sanitary Manufacturing Co.

A NATIONAL INSTITUTION
OF SANITARY SERVICE





Why Bishopric Board Was Used on This House

Substantial, roomy, comfort, artistic beauty — are all characteristics that predominate in this home of Architect H. C. Buck in Hartford, Conn. It was designed to withstand severe changes in temperature, high winds and driving rains, and to maintain for generations its completeness and perfection.

And to secure the greatest results, Bishopric Board was specified as a background for the stucco finish.

Stucco on Bishopric Board will not crack or flake off if stucco mixture is properly made and applied. The stucco is dovetailed into creosoted lath so it can't let go. And the lath are imbedded in asphalt mastic on a background of heavy fibre-board — a perfect protection against heat and cold, wind and weather — a combination that is water, vermin and sound proof.

Bishopric Board has been used on thousands of buildings, it has withstood the test of time, and in actual use it has demonstrated its superiority as a background for stucco finish.

Every architect, contractor and builder is vitally interested in producing stucco-finished buildings that last. Bishopric Board will meet your most exacting requirements.

The Bishopric Manufacturing Co.

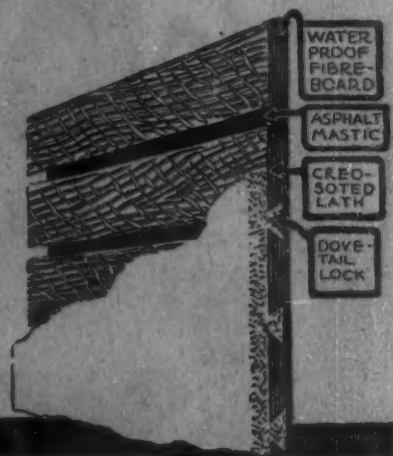
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Write for our free book, "Built on the Wisdom of Ages," illustrating homes, apartments, factory and public buildings finished in stucco on Bishopric Board. It contains letters from architects, builders and users, and extracts from reports of scientific tests. It also gives full instructions for making a stucco mixture that will last. With this book we send free samples of Bishopric Board.

Write to-day, investigate for yourself.



The Word That Wins The \$100

“Alpina”

THE PEAK OF EFFICIENCY

THE WORD CONTEST for a name for our new patent Siphon Revolving Ventilator has been decided in favor of Mr. A. J. Russell, 314 National Realty Bldg., Tacoma, Wash., who suggested “Alpina” as the name and “The Peak of Efficiency” as a slogan. A check has been forwarded to Mr. Russell for the amount above named.

A WORD FROM THE PRESIDENT

The decision of the committee of advertising men, who picked this name as best among nearly 1,000, is final. However, I wish to thank all those participating in this contest, as many other names were submitted of unquestionable merit.



President

“The Peak of Efficiency” in Ventilation Is
The **“ALPINA”**



A full description of the “Alpina” Siphon Revolving Ventilator was given in the circular letter sent to architects. We have not room to repeat those details here, but will see to it that architects are fully informed of its exceptional merit. For present purposes, suffice it to say, the “Alpina” has three-fifths more ventilating capacity than other ventilators.

The “Alpina” had been appreciated and specified by architects even before this contest was decided, showing that it was quickly recognized as the peak of efficiency among ventilating devices.

Milwaukee Corrugating Co.

Manufacturers of Sheet Metal Building Products

Branch at Kansas City, Mo.

MILWAUKEE, WIS.

